YOUR COMPUTER

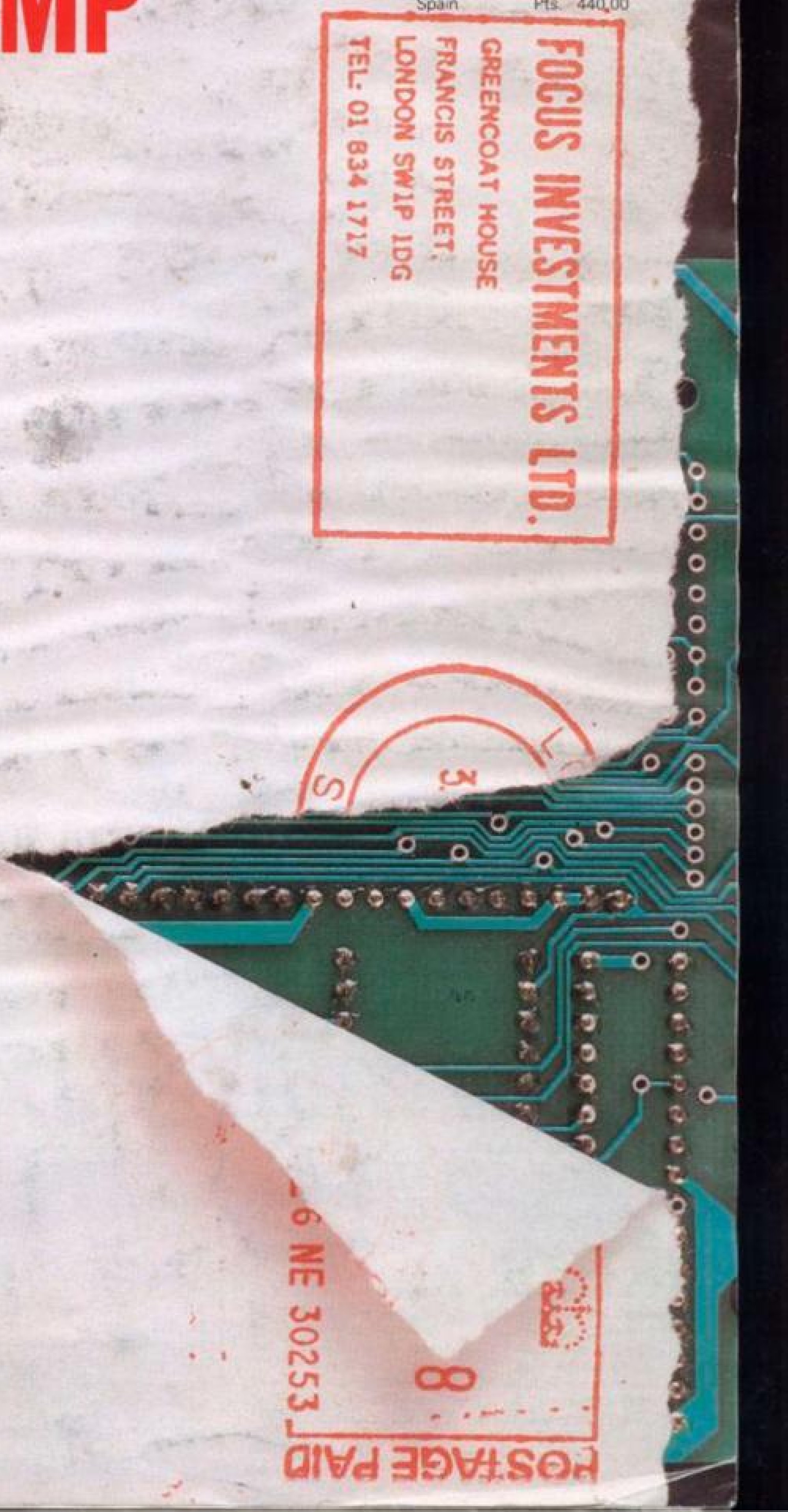
APRIL 1988

£1.35

Denmark	DKr.	36.00
France	Fr.	52.50
Germany	DM.	10.00
Greece	Dra.	460.00
Netherlands	DFl	8.90
Italy	L	4400
Spain	Pts.	440.00

PUT YOUR STAMP ON COMMS

A FRANK ASSESSMENT



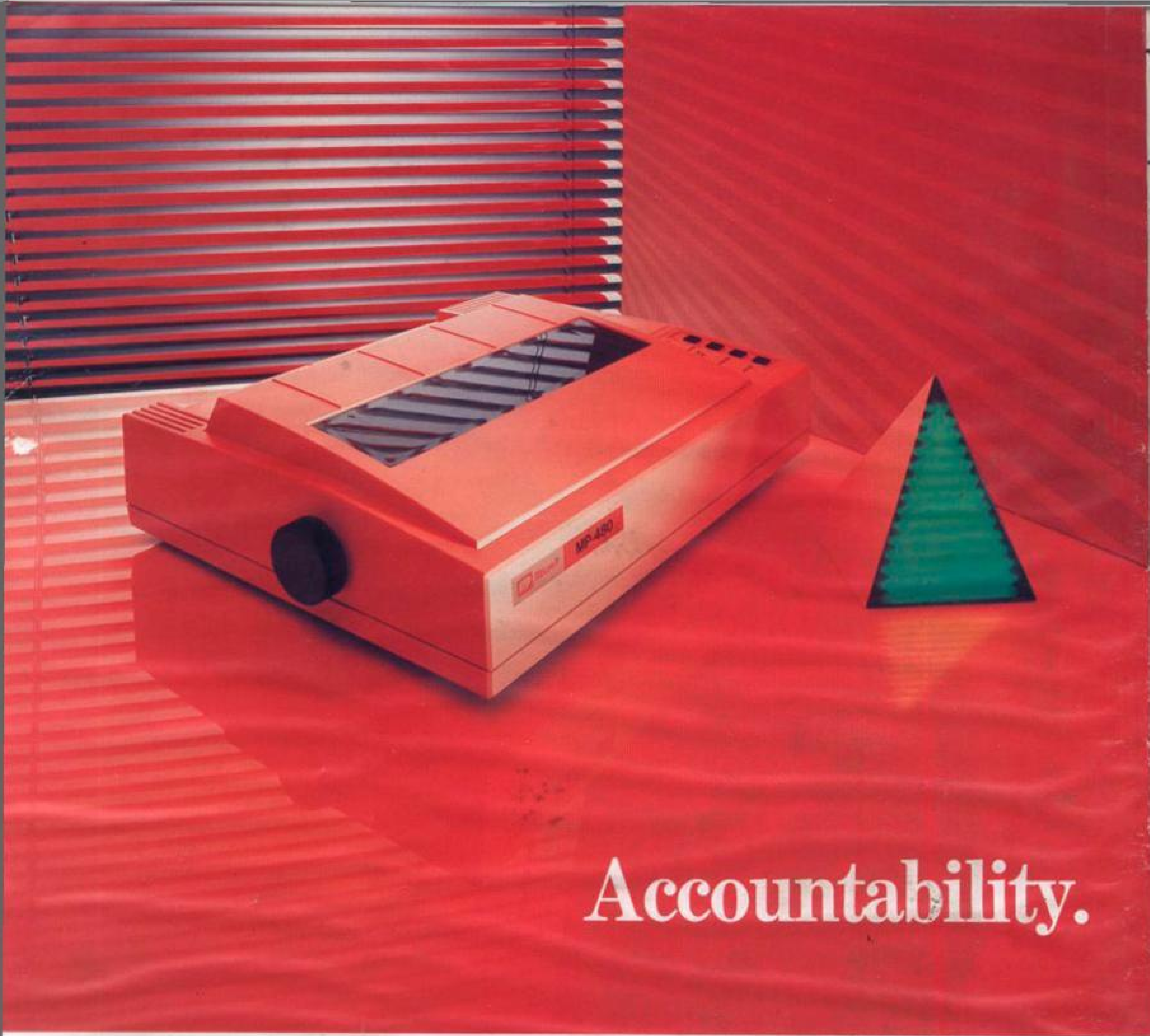
EXPLOIT YOUR ST GRAPHICS POTENTIAL

TRANSPUTERS IN MEDICINE

THE SECRETS OF 5GL

PC ENTERS BBC ARENA

WIN A COMPLETE COMMS KIT


Accountability.

contents

APRIL 1988



**Your Computer,
Greencoat House,
Francis Street,
LONDON SW1P 1DG
TELEPHONE: 01-834 1717
FAX: 01-828 0270
TELEX: 9419564 FOCUSG**

ISSN 0263 0885

Printed by Cradley Print, England.
Typeset by Time Graphics Ltd., Northampton.

Distributed by Quadrant Publishing Services, Quadrant House, Surrey, SM2 5AS. Telephone 01-661 3239.

Subscriptions: U.K. £15 for 12 issues, Overseas (surface mail) £30 – airmail rates on request. Please make cheques/postal orders payable to Focus Magazines (allow 5 weeks from receipt of order to delivery of first subscription copy). Send orders to Your Computer Subscriptions, T.I.L., P.O. Box 74, Tonbridge, Kent TN12 6BW.

Back issues of the magazine from January 1986 onwards are available for £2.00 (U.K.), £2.75 (Overseas) from the Back Issues Department, Greencoat House, Francis Street, London SW1P 1DG.

FEATURES

NEXT MONTH

In May we look at the use of computers in politics. How do the parties organise their systems and which is the politicians' favourite micro? We also round up the best accountancy packages available. On sale, April 14th.



COMMENT

This month we devote considerable space to the fascinating subject of computer communications. To date, people have been deterred from venturing on-line with their computers because of the expense involved. That expense is caused by the cost of the on-line services but also by the price of the peripheral equipment, especially modems, which is needed.

That is about to change. The new Amstrad modem offers a high-quality specification at a remarkable low price. That development is due to the aggressive pricing policy of Amstrad and to the availability of new chips which reduce the cost of constructing modems. Once again, we owe thanks to Alan Sugar.

FOCUS MAGAZINES

Executive Editor Francis Jago
Assistant Editor Amon Cohen
Staff Writer Leslie Bunder
Chief Sub Editor Harold Mayes MBE
Production Manager Nick Fry
Copy Department Serena Hadley, James Pyle
Art Editor Neil Tookey
Advertisement Manager Ian Faux
Advertisement Executive Hari Nada
Editorial Secretary Sheila Baker
Managing Editor Brendon Gore
Merchandising Executive Ann Arnold
Publisher Trish Phillips
Group Publisher Paul Coster BSc
Financial Director Brendan McGrath
Chief Executive Richard Hease
Cover Photograph by Nick Walker



STAR FEATURES

- Fingertip 'Action Buttons' for Fast Precise Control
- Revolutionary Combined Direction & Fire Buttons
- Auto-Fire Mode
- Burst-Fire Mode
- Flat Profile for Easy Both Hands Use

AND ITS

ONLY £18.85!

PRICE INCLUDES VAT. ADD 75p FOR P&P.
OVERSEAS CUSTOMERS ADD £1 EXTRA TO COVER P&P.

Instead of the old fashioned joystick, 'ACTION BUTTONS' control direction & fire BUT — this is neat — Star-Trak has a second set of buttons which combine direction AND fire into one! STAR-TRAK'S fingertip control enables even the 'learner' to reach scores old fashioned joysticks can't reach.

What's more, the slim, low profile design means you can use both hands at once!

The good news doesn't end there. STAR-TRAK features a three position fire control switch — OFF, AUTOFIRE and the amazing BURST FIRE mode. With BURST FIRE you get a short or long burst of fire each time you press and hold down the central fire button — it's deadly!

Get your hands on Star Trak today.

DESIGNED AND MANUFACTURED IN THE U.K. BY

R. H. DESIGN Dept: YC.04
Units 2 & 3, Stonefall Stables
Stonefall Avenue, Harrogate HG2 7NR
Tel. 0423 880520

UNBEATABLE PRICES

3½ DISC

Lifetime guaranteed, double sided double density 135 TPI Bulk Discs

10 DISCS	£9.99
20 DISCS	£18.99
25 DISCS	£23.49
50 DISCS	£45.00
105 DISCS	£90.00
40 Lockable Disc Box	£5.49
80 Lockable Disc Box	£7.49

5¼ DISC

Life time guaranteed, double sided double density 48 TPI Bulk Discs

10 DISCS	£3.50
20 DISCS	£6.99
30 DISCS	£9.99
50 DISCS	£15.50
105 DISCS	£31.00
50 Lockable Disc Box	£5.49
100 Lockable Disc Box	£7.49

★30% OFF ALL SOFTWARE★
★30% OFF ALL CABLES★
★15% OFF ALL HARDWARE★

THIS IS A SPECIAL OFFER ATARI 520 STFM £225 + VAT

P&P FREE ON ALL ORDERS OVER £15.
UNDER £15 ADD 75p

Send cheque or POs to:

CESTRIAN SOFTWARE

2 Waterloo Road,
Off Liverpool Road,
Chester CH2 2AL.
Phone 24hr 0244 371952

OR ORDER BY ACCESS OR VISA

PHONE FOR OUR SPECTACULAR DISC DRIVE AND PRINTER PRICES.

NEWS

Infocom moves into comics



● **The first three titles to be released in the Infocomics range.**

Infocom surprised the software world at the Consumer Electronics Show in Las Vegas with the announcement of a comic book genre for the computer. It is a novel departure, not only for Infocom, which has hitherto produced only text adventures, but for all other software houses.

Infocomics will tell stories with text and graphics. It will be interactive to the extent that the user can decide which character he wishes to follow in the narrative, swapping to another at regular intervals. There is no games or puzzle element.

The technology was developed by Tom Snyder of Tom Snyder Productions and the scripts were written by Infocom. Certain programming innovations have been used to allow the maximum of graphics with the minimum of disc storage.

The first three titles to be announced are Lane Mastadon vs The Blubbermen, a comic spoof of 1930s space fiction; Gamma Force in Pit of A Thousand Screams, a super-hero tale featuring a trio of aliens and Zorkquest: Assault On Egreth Castle, a fantasy adventure about a caravan of travellers manipulated by an evil magician.

It seems that the gentle Infocom irony to which we are accustomed will be present here as well. The protagonist of Lane Mastadon, for instance, is a chartered accountant turned super-hero.

Mandy Hall of Infocom believes the revival of interest in comics in the U.K., spearheaded by Alan Moore's superlative Watchmen series, will guarantee a successful reception for Infocomics. Research in the U.S. has indicated that computer ownership among comic book readers there is three times the national average.

Infocomics will be available initially on the Commodore 64/128 and IBM PC-compatibles.

Three-legged man removes ST gremlins



Due on the ST from Rainbird this month is a game with the working title of *Verminator*. Costing £24.95, it features a three-legged vermin catcher whose mission is to rid a tree kingdom of all the pests with which it is infested. Starting rather crudely with the choice of a hammer or a brick for a weapon, the verminator is paid according to how many creepy/crawlies he can vanquish. If he is short of cash he can visit the arborial equivalent of the Mob for a loan.

Your Computer was shown the first preview of the 250-screen game and it looks like being another winner for Rainbird. Particularly good are the cartoon pastoral graphics. They were drawn by Chris Hinsley who was responsible for the ST Art Studio.

● ***Verminator* from Rainbird.**

Amiga virus spreads through media

The virus corrupting Amiga software continues to rage unabated. The problem has been compounded by a new strain perpetrated by a group called the CCW. As the corrupted program goes down, a message flashes on the screen, declaring "Something wonderful has happened," as does the original Swedish Cracking Association statement. The CCW version then appends this with a sentence of its own: "This has been programmed by CCW and Odie of AEK".

While the daily press and television is being attracted to the story, with an item on News at Ten, an article in *The Independent* and a leader on the matter in the *London Evening Standard*, Commodore is starting to treat the problem seriously and is talking to dealer Silica Shop about bundling a virus killer with new Amigas.

Silica Shop is providing its free killer program for all its Amiga customers as a matter of course. It will also be supplied to any members of the public who send a blank 3½in. disc and a SAE to Amiga Virus Killer, Silica Shop, 1-4 The Mews, Hatherly Road, Sidcup, Kent DA14 4DX.

John Arundel, marketing controller of Silica Shop, hopes that the ready supply of an antidote will bring the virus episode to an end. "Obviously it is a serious problem", he says, "and whether it goes away depends on the vandals who committed it".

It seems, however, that the cracking story is not yet over. Strong rumours are reaching the U.K. that a virus similar to the Amiga one is spreading among IBM PCs and compatibles in the U.S.

Joysticks vanquished at the push of a button

Joysticks could be a thing of the past if a "revolutionary" push button games control system called Star Trak catches on. Marketed by RH Design of Harrogate, the control panel consists of 17 buttons, one in the middle for firing, eight in an inner ring for controlling movement and eight in an outer ring which allow for simultaneous movement and firing.
RH Design claims that the "action buttons" permit far greater precision than is possible with a joystick. Movement on the panel is responded to on the screen instantaneously. Also, so the manufacturer says, it introduces a range of extra commands to established games. Pressing two movement buttons simultaneously can cause characters on the screen to move in extraordinary ways.

Roy Huddart, one of the partners marketing Star Trak says it comes truly into its own when used in karate games.

Star Trak costs £18.95 plus 75 pence postage and packing. It is available from RH Design, Units 2 and 3, Stonefall Stables, Stonefall Avenue, Harrogate HG2 7NR. Tel: 0423 880520. It is guaranteed for 12 months.

Casio launches Z-88 function calculator

Casio has released a new programmable calculator, the FX5000F. It has 288 functions including 128 pre-programmed mathematical, scientific and engineering formulae. There is a formula memory of 675 steps and it is able to take up to 12 user-generated formulae.

Pre-programmed formulae can be loaded into the user program area and viewed or edited. The FX5000F has a recommended retail price of £39.95.

MultiSpeed price tumble



● **The NEC MultiSpeed has been reduced by £600.**

NEC has reduced the price of its MultiSpeed lap-top computer from £1,595 to £995. Since it was launched in March, 1987 several additions have been made to the portable market from direct NEC rivals such as Sharp and Toshiba and, above all, from the entry of Amstrad with the price-breaking PPC.

Another reason for the price reduction is that NEC has introduced another lap-top at the top of its range, the PowerMate portable. It is a 286 machine which costs £2,695 for the 20MB hard disc version and £2,995 for the 40MB hard disc version.

Mega ST discs up to 40MB from Frontier Software

A new internal hard disc for the Mega ST is to go on sale. Frontier Software, distributor of the Supra range of hard discs is to release the MegaDrive. It will be made available in three sizes – 20MB, 30MB and 40MB.

The retail price for the 20MB will be £589.95 and for the 30MB, £799.95 and a price has yet to be decided for the 40MB.

The MegaDrive offers speedy auto-booting of the system from the hard disc and up to 12 partitions. The MegaDrive connects to the rear of the DMA port and leaves the external port for additional expansion.

For more details ring Frontier Software on 0423 67140.

NEW LOWER PRICES AND... EVEN BETTER SERVICE!

Now ALL Goods Despatched SAME DAY by 1st CLASS POST-FREE!

PRINTER RIBBONS

Genuine AMSTRAD Printer Ribbons...
Better Quality-Lower Price!

- NEW PCW CARBON £5.95
- STANDARD PCW £4.95
- DMP 2000/3000 .... £4.95

All Ribbons-POST FREE!
Please Specify Printer when Ordering

PAPER

- High Quality 11" x 9½"
- 60gsm Weight
- Micro-Perf all Round
- 2000 Sheets –

ONLY £14.95 Post Free!

PCW SOFTWARE SPECIALS

- LOCOMAIL (Amsoft) *THE MAIL MERGE PROGRAM* — **£34**
- LOCOSPELL (Amsoft) *THE SPELLING CHECKER* — **£34**
- NEWSDESK INTERNATIONAL (The Electric Studio) *THE DESKTOP PUBLISHING SYSTEM* — **£44**
- SUPERCALC 2 (Amsoft) *THE SPREADSHEET* — **£44**
- MASTERFILE 8000 (Campbell Systems) *THE DATABASE* — **£44**

FREE! Blank Disk with each of the above Software Specials.

PCW STARTER PAK

- 10 CF2 Disks
- 1 AMS 20L Box
- 2000 Sheets of Paper
- 1 PCW Carbon Ribbon

'Special Pak Price' **£49.95**

SAVE ALMOST £9! Post Free!

NEW IN STOCK

High Quality PVC Dust Cover Set (for PCW) **£9.95**

How to Order...

- Simply list your order, name and full address with a cheque or postal order (made payable to Compumart) and post to our address opposite or:-
- Phone any of our 3 order lines (24 hours) and order using your credit card. Please give your full name and address, daytime Phone number, details of your order and the name of the magazine you are ordering from.
- All goods are usually despatched same day — 1st class post – FREE OF CHARGE!
- For SPEEDY GUARANTEED NEXT DAY DELIVERY by SECURICOR, Please add JUST £5 to goods total.
- We welcome official written purchase orders from plc's, government and educational establishments etc. Goods will be despatched on receipt of order, 28 day invoice will follow.
- Overseas orders:- please deduct VAT (15%) then add 25% for air mail and insurance. (All payments in £ sterling).
- All prices include VAT. Prices and delivery subject to availability. All goods fully guaranteed.

3" DISKS



New Low Price!

5 Pack ONLY **£11.95**

10 Pack ONLY **£22.99**

Post Free!

Genuine AMSOFT CF2 3" Microdisks from the U.K.'s largest supplier.
(CF2 Disks are for CPC & PCW Machines).

- CERTIFIED 100% ERROR FREE
- LIFETIME GUARANTEE
- INDIVIDUALLY CASED
- USE IN 1st and 2nd DRIVE (on PCW)

Excellent Value ONLY from Compumart
Phone for Quantity Discounts.

DISK STORAGE



ONLY £12.95 Post Free!

The superb AMS 20L Disk Storage Box.
Save your Valuable Disks from spilt drinks, dust etc.

- HOLDS 21-3" DISKS (Cased)
- HIGHEST QUALITY PERSPEX
- HINGED, LOCKABLE LID (with 2 keys)
- PRECISION MOULDED – No Disk Rattle

Excellent Value ONLY from Compumart

Compumart

A GREAT DEAL MORE · FOR A GOOD DEAL LESS!

COMPUMART · Dept YC · Jubilee Drive
Loughborough · Leics · LE11 OXS
☎ 0509 – 610444 (5 lines)

SPEEDING THE PROCESS



THE 80386 CHIP DOMINATED THE 1988 WHICH COMPUTER? SHOW BUT SOME OF THE VISITORS WERE LOOKING FAR BEYOND THAT.

The Which Computer? Show is Britain's premier showcase for business microcomputers. That means you cannot walk 50 yards without tripping over something wildly innovative. It means that the bulk of the stands have an aura of highly-profitable normality. There is never an ST to be seen and even Commodore makes sure it has plenty of PCs to balance its Amigas.

There is plenty happening beneath the surface and at this year's show at least one old favourite may have been dropping hints about his next micro. After almost two years in the wilderness Sir Clive Sinclair looks increasingly to have made yet another comeback with the Z-88 portable. He concedes that the machine has been moving slower than he expected but sales in the U.K. are good and he is poised to take advantage of the favourable reception of the machine in the States last autumn.

EXCITED

The U.S. market is getting excited about the possibility of Sir Clive linking with Atari founder Nolan Bushnell to produce the perfect portable. The pundits are praying for an Apple Macintosh-like machine no bigger than the Z-88 but Sir Clive, although he does not deny talking to Bushnell, says he is looking towards desk-top computing rather than portables for his next machine.

There are no promises yet but he hopes to be able to incorporate the fruits of his other two ventures, a portable telephone and wafer scale integration into any such machine and that is where it becomes interesting.

The WSI project, which Sir Clive says should have produced a saleable product by the end of this year, is usually regarded as being a RAM-based alternative to hard disc storage, offering megabytes of storage on cheaply-produced wafers of silicon.

The cost advantages were almost there four years ago but the cost of hard disc storage has fallen so drastically that WSI cannot compete in these terms. The truth, however, is that storage has always been a by-product of the WSI project. Silicon chips are normally made from wafers of silicon with circuitry printed on to them. Chips are then cut out, tested, and the bad ones rejected. WSI is intended to test itself and to have a high enough hit rate for damaged circuitry to be patched out, leaving most of the wafer operational.

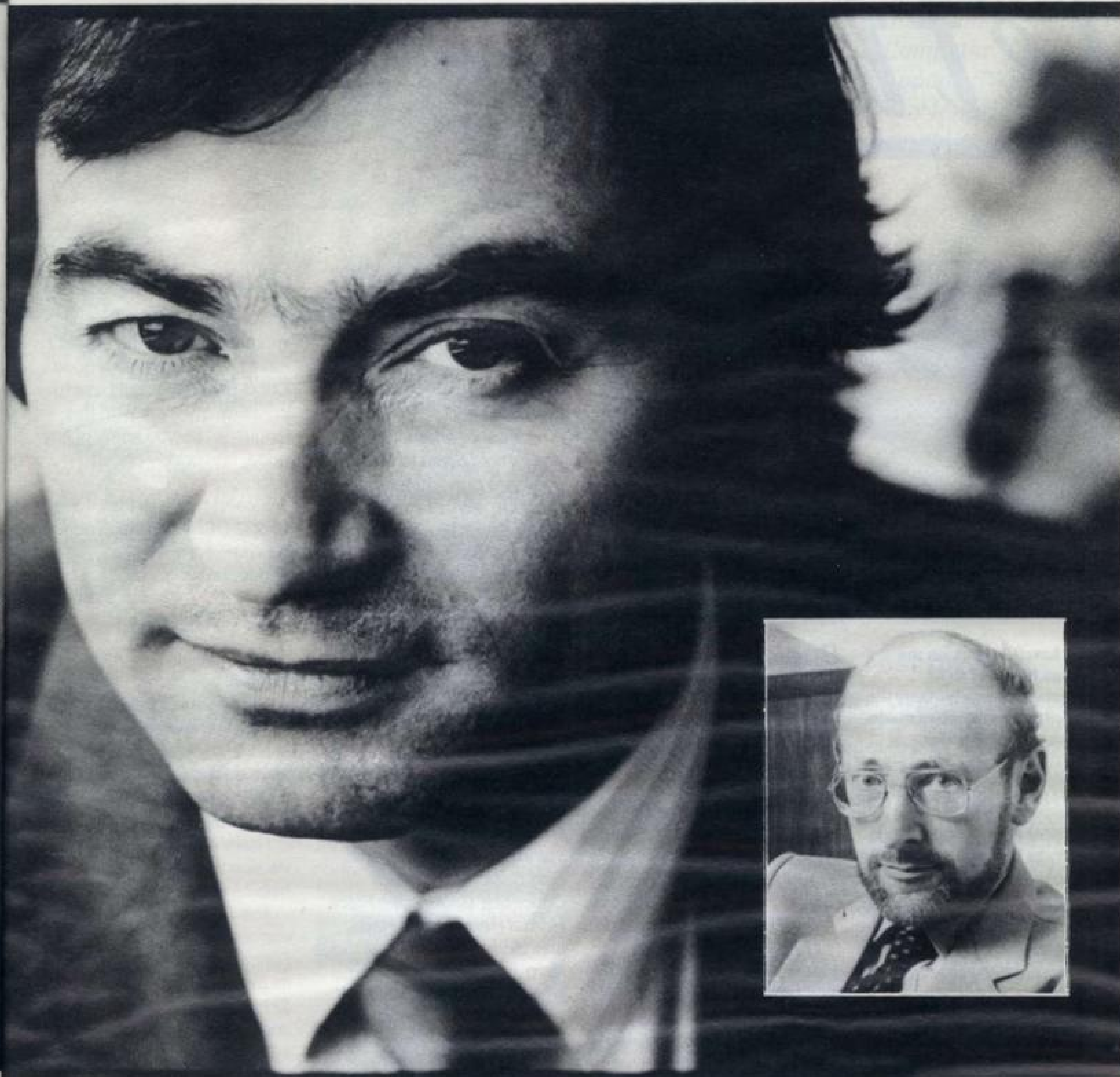
That need not necessarily apply just to storage. If the circuitry can link in a variety of ways and can think for itself you are also talking about processing power — parallel processing power. Sir Clive's WSI is, in fact, intended to allow you to run many tasks concurrently, or to apply massive processing resources to particular problems, resulting in speed gains of the order seen with the Inmos Transputer, also a parallel processor.

Introducing the Recognition of Information Technology Achievement awards on the first night of the show, Sir Clive launched on a characteristic Mad Boffin/Pigs in Space spiel on the subject of androids, silicon life forms and the future of computing. The assembled diners shifted uncomfortably but in this case Sir Clive is not out of his tree at all. Parallel processing, the way the human brain operates, is seen as providing the kind of power we need for the next leap in artificial intelligence. In the shorter term, however, it could de-stabilise and de-centralise the entire computer industry.

PRIZE

Atari was not at the show but U.K. managing director Bob Gleadow was, to look around and to collect his runner-up prize in the awards ceremony.

Gleadow took Sir Clive seriously and afterwards pointed to another aspect of parallel processing on which he had touched extremely fast and powerful processors can emulate existing proces-



sors with ease, which means Sir Clive's machine, the Atari Transputer and the Acorn Archimedes should be in a position to break down IBM dominance of the business and, in the U.S., increasingly the home computer market.

There are IBM emulators for machines based on the 68000 processor and it is possible to get a Mac emulator for the Atari ST. There are serious physical limitations on devices of this kind because the speed losses associated with software emulation means you make your personal supercomputer run like some miserable dog-processor box.

There is a limit to how fast you can make processors go and we may be reaching it soon, so you cannot increase performance to make it go much faster in emulation mode. Hardware emulation involves running a second processor, so by doing it that way you will always produce a machine more expensive than its single-processor rivals.

Parallel processing, however, can deal with the extra tasks needed to produce high-speed emulation – faster than the original usually – so the Abaq, the Archimedes and any machine from Sinclair should be able to emulate the IBM PC or the Apple Macintosh with ease.

GATE

Gleadow doubts if Sir Clive will be able to break in at this late stage – somewhat outrageously, considering how short a time Atari has been working on its Transputer machine – but now seems to be visualising the Abaq as the machine it will use to take on IBM and Apple.

Atari was at one time looking at a software PC emulator for the ST and is rumoured to be talking to Apple co-founder Steve Jobs about the possiblity of putting together a machine combining ST and Apple emulation. It now seems more likely that Atari will do this with the Abaq, not the ST. It is also not at all clear that Jobs has any part in Atari plans, as the company, with care, can build a legal Mac emulator without his help.

Other companies, however, are on the trail. Apple has expressed an interest in Acorn' Reduced Instruction Set architecture, while Acorn parent Olivetti is working on something unspeakably clever in its HQ in Ivrea, Italy. Even IBM has dusted-off its Risc machine to keep people busy while it thinks of a better idea. While 1988 will probably be an interesting year, for other reasons 1989 should be a really interesting year.

● Both Bob Gleadow of Atari (main picture) and Sir Clive Sinclair are interested in parallel processing.

letters



● **The function keys on the Amiga have yet to be exercised properly. Only the Hi-Soft assembler has made full use of them so far.**

Manual control

The manuals accompanying my Amiga 500 do not explain how to use the 10 function keys, F1-F10, on the keyboard. If they are like the MSX and the BBC machines they should save time when entering programs. Can you explain how they are accessed?

W.E. Jones, Essex.

Editor's reply:
So far as I can see, the function keys do nothing except return the character values 129-138 – with CTRL this becomes 1-10 – for Amiga Basic. The Workbench does not use them and neither does the CLI. Notepad uses them to return the character ~ or when shifted ~0 to ~9 but this does not appear to be of much use.

The idea of the function keys seems to be aimed at future software developers who can use them if they want to do so, say to emulate IBM-style function keys. The only program in which I have seen them put to any reasonable use is the HiSoft assembler editor, where they are used for marking blocks.

Book worming

I am writing in the hope that you can help me with some tips on good books to buy. I have looked everywhere for books about 68000 programming on the Atari ST including details about the internals but there is none to be found.

Tommy Gröunes, Perstorp, Sweden.

Editor's reply:
The three main books I would recommend are The Concise Atari ST 68000 Programmer's Reference Guide *by Katherine Peel, published by Glentop, Standfast House, Bath Place, High Street, Barnet, Herts, U.K.;* The Anatomy Of The Atari ST, *published by First Publishing, 20B Horseshoe Park, Horseshoe Road, Pangbourn, Berkshire, U.K.; and* 68000 Assembly Language Programming *published by Osborne/McGraw-Hill. All are available from the publishers and from most good Atari ST dealers, so you should not have too much difficulty obtaining them.*

Basics

On my Atari ST I use the Basic language which I find rather slow and inconvenient. I would be grateful for information on alternative languages or versions of Basic. Could you also recommend a book which explains computer languages simply and clearly?

E. Aziz, Longstanton, Cambridge.

Editor's reply:
A number of alternative versions of Basic to the ST Basic are provided with the machine. Which you choose depends a little on what you want the Basic to do and how much you are willing to pay. The most common versions are GFA Basic, Glentop, Standfast House, Bath Place, High Street, Barnet, Herts, price approximately £55; interpreted and compiled versions available. HiSoft Basic, The Old School, Greenfield, Bedford, price approximately £80; compiled and very similar to the standard Microsoft format. Fast Basic, Computer Concepts, Gaddesden Place, Hemel Hempstead, Herts, approximately £80 in cartridge form for fast access and it includes an assembler a la BBC Basic. It is difficult to choose between them since they are all fairly good and much better than ST Basic.

If you want to try other languages there are a number of versions of C, Megamax, Metacomco and Lattice being probably the best, or you may like to try Pascal. Again, Metacomco has a good version.

As to learning a language, I have not seen a good book which explains things simply. Tutorials are, in general, rather a waste of time and you would be far better working through the few examples given in the manual and then going through each command to see what it does. The more you use a language the more familiar you will become with its capabilities and hence its possibilities.

Cobol corner

I have had an ST for several months and from the outset I have been looking for a good Cobol package I could use to continue my work with this language. Do you know of any good, reasonably-priced packages?

Finally, how can I tell if the RS232 DCD line is high on my ST – i.e., someone has connected to my modem?

I.J. Salmon, Chelmsford, Essex.

Editor's reply:
Cobol is not something of which I know a great deal and so I cannot recommend a specific package. Possible sources are Grey Matter, 0364 53499; Systems Science, 01-251 0043.

I have never heard of an ST version. Perhaps readers can help?

The Data Carrier Detect comes into the ST 68901 Multi Function Peripheral on bit 1 of its input port. This is located at $FFFA01 in the memory map and you will need to be in supervisor mode. From machine code, the best way to see if the DCD is high is to use: BTST.B#1,$FFA01 Test bit 1 BEQ dcdset. Or in Basic, IF (PEEK(&HFFA01)AND2) = 1 THEN PRINT "DCD SET".

Note that supervisor status is necessary and how this is done from Basic depends on the Basic – Atari Basic needs DEF SEG>0.

Screwed Philips

I am writing programs in Basic on the Philips P2000 portable computer and cannot find a way to disable the break – CTRL+C – key function when running programs. The manuals which accompany the Philips give no hints and are, in general, badly-written. If you know of a method, is it the

Something to say about personal computing? Why not share it with other readers? Write to Readers' Letters, Your Computer, Greencoat House, Francis Street, London SW1P 1DG. Letters may be edited for length. Do not forget to include your name and full address.

same for all computers which use CTRL+C to break? I would like the same information for the Apricot range if possible.

S. French,
Newtown, Birmingham.

Editor's reply:
How the CTRL+C is disabled depends usually on the type of Basic you have. Microsoft Basics generally use the ON BREAK GOTO command or, since Break may be considered an error, ON ERROR GOTO is also a possibility. If the Basic is from Digital Research, i.e., Personal Basic, the CTRL+C is disabled by setting a byte in the option table. This can be found at the start of the current data segment – set with DEF SEG= start of segment – plus 258.

In this table, an offset of one gives the location of the Control C Trap. Poking a one here causes CTRL+C to produce error code 99 instead of stopping the program; zero re-sets to normal.

You should use this with care, since infinite loops cannot be stopped unless you use ON ERROR GOTO. I do not know what type of Basic you are using so I cannot say for sure whether the above information will be of help.

How to be funny

I am interested in using my own "funny formats" on discs. I have a CPC6128 and I am learning machine code slowly and, even more slowly, CP/M programming. Is there some way to alter the format identifier from &C1 (data), & 41 (CP/M), or &08 (IBM), to another value when formatting? I know that there is an entry in the directory which holds the user number and this is also held at &A701 in RAM. I assume that there is a similar entry held somewhere else in RAM which can be changed by the user. The only difficulty is that I have not been able to find it. I am saving for a firmware guide but as I am unemployed it will be a long time before I can get one.

M. J. Lyons,
Burnage, Manchester.

Editor's reply:
The first three formats you mention are, in practice, very similar but unfortunately you cannot fool the system in the manner you suggest by changing the format identifier. It should be possible to format discs in all kinds of odd formats using the following information.

The BIOS routine Select _Format (Jumpblock – &BE86) allows the three standard formats to be selected by loading the following values into register A-&41 System, &C1 Data, &01 IBM. Register E holds the drive number.

BIOS routine Format _Track (&BE8F) formats a single track with the address of the header information buffer in HL, the drive number in E and the track number in D. The header information consists of a set of four bytes for each sector starting with sector 1: Byte 0 Track number. Byte 1 Head number. Byte 2 Sector number. Byte 3 Log_2 (sector size) with the same for sector 2 and so on up to the number of sectors per track. On exit, if the carry is true then the track was formatted and A = 0, otherwise A gives the error number.

Before using Format _Track an extended parameter block – XPB – must be present. There is one of them for each drive and their locations can be found by using the address in &BE40 which points to another address which then points to the disc parameter block, the first of which is drive A, the second drive B. The parameter block is set out in figure one and can be altered to obtain "funny formats".

If you set bit zero of reg E to zero and byte 24 of the XPB to zero when calling Seldisk (BDOS 14) the system will try to determine the format of the disc and alter the XPB accordingly.

This information should give you a starting-point at which you you can begin playing with the various formats. The manual to obtain is the CPC CP/M BIOS technical specification which contains all this information and more.

Figure 1. XPB

Byte No.	Contents	System	Data	IBM
0	Sectors per track	36	36	32
1	Block shift	3	3	3
2	Block mask	7	7	7
3	Extent mask	0	0	0
4	Number of blocks	170	179	155
5	Number of DIR entries	63	63	63
6	ALO directory blocks	&CO	&CO	&CO
7	A11	0	0	0
8	Size of checksum vector	16	16	16
9	Reserved tracks	2	0	1
10-14	I'm not too sure about	?	?	?
15	First sector number	&41	&C1	&01
16	Number of sectors per track	9	9	8
17	gap length (R/W)	42	42	42
18	gap length (format)	82	82	80
19	format filler byte	&E9	&E9	&E9
20	log2(sector size)	2	2	2
21	sector size in bytes (must be a power of 2)	4	4	4
22	current track (set by BDOS)	0	0	0
23	reserved	0	0	0
24	0=auto format select. &FF non-auto select	0	0	0

Test drive

At the age of 62 I just became the possessor of my sixth PC, an Atari ST. Would you recommend a Panasonic JU 3631M disc drive as a second drive for the ST? I have seen some advertised at £59.50 without lead; or would you recommend that I strick to the Atari hardware?

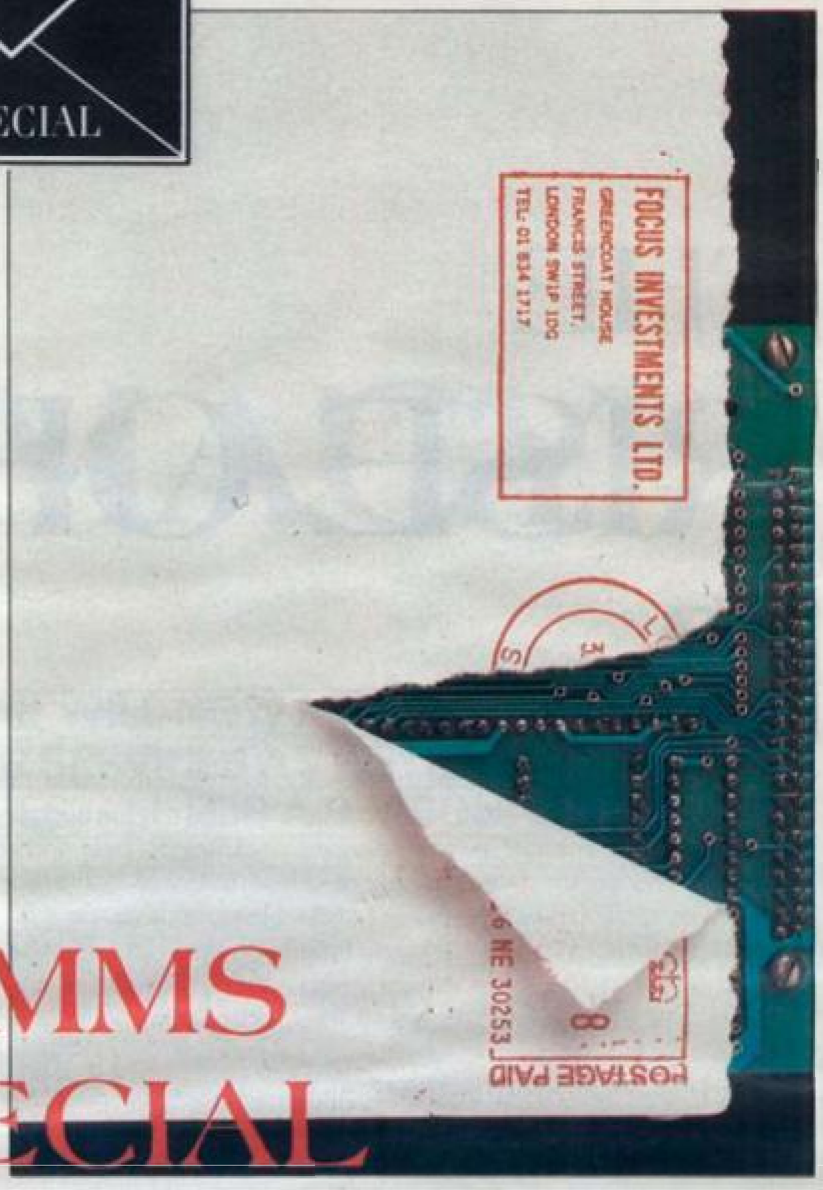
G.R. Linley,
Nottingham.

Editor's reply:
I cannot find details on the disc drive you mention but it appears to be very cheap when compared to other similar machines from Atari, Cumana or AS & T which range from £100-£150. The two things to bear in mind when buying a second disc drive for the ST are if it will be easy to connect and get working – for instance it may not have a power supply; and if it takes 5.25in. or 3.5in. discs. If it takes the former you will have to buy two types of disc for one machine and have the disadvantage that a disc from one drive will not work with the other.

On the whole, I think you would be better staying with a standard 3.5in. drive from a reputable company such as Cumana or Atari which has its own power supply, leads and guarantee.


CHEETAH 125 Special
The Revolutionary Joystick
● Four Independantly Controllable Fire Buttons, each of which may activate it's own Assignable Functions ● Centre Return. ● Extra Strong Stabilising Suction Cups.
● Auto Fire Facility. ● 12 Month Warranty. ● Compatible with SPECTRUM 16K, 48K, 128K(using dual port interface),+2, +3, ATARI, COMMODORE 64, AMSTRAD CPC Range (with adaptor) etc. ● 8 Directional Control.
● Unique Rotate Function. ● Ergonomically Designed Hand Grip.
● Rugged Long Life Contacts.
● Also functions as Standard Type Joystick.
CHEETAH present The Most Innovative Development Ever In Joystick Technology. Imagine one of the first computer games - 'TANKS', a plan view of two tanks on a battlefield. First, put in a realistic background and some great sound effects, which is easy by todays standards - the game is still DULL. Now add more control to the tanks. Instead of the tanks only being able to fire in the direction that they are facing, you can now Rotate the Turret. You can Fire Broadside whilst dashing for cover, or Fire Backwards whilst retreating. The second fire button could fire a machine gun at the front, the third button lay mines and the fourth buttton shoot flares to light up the screen in night battles; or perhaps call up information on ammo or fuel left. Now imagine this new concept being applied to other games - Loop The Loop, in Flight Simulator games. High Jump in the Decathlon. Instant Realism, Instant Excitement, and Instant Skill are added.
All this is now possible with the patented 125 SPECIAL.
All the major software houses are now releasing games to take advantage of this new development making their games even more exhilarating.
The Special will also act as a normal joystick.
ONLY £12.99
Please state computer model when ordering
Prices include VAT, postage & packing. Delivery normally 14 days.
Export orders at no extra cost. Dealer enquiries welcome.
Cheetah, products available from branches of Dixons Harrods
LASKYS WHSMITH High St. Stores
and all good computer shops or direct from Cheetah.
PRESTEL
Cheetah Marketing
CHEETAH MARKETING LTD
Norbury House, Norbury Road,
Fairwater, Cardiff CF5 3AS.
Telephone: Cardiff (0222) 555525
Telex: 497455 Fax: (0222) 555527

COMMS SPECIAL



COMMS SPECIAL

THE ESSENTIAL *YOUR COMPUTER* GUIDE TO THE EXCITING WORLD AT THE END OF YOUR MODEM.

Going on-line is one of the buzzwords of the moment. For many computerists the term means buying a modem and communications software to run on your computer and getting the system hooked to a distant computer, connected only by a telephone line.

What is computer communications? What is a modem? Computers save their data to tape or disc in a sequential manner. Data is streamed to tape or disc and, when the time is right, fed back into the computer in the same sequence as it was recorded. Instead of a tape or disc, suppose we put a second computer at the end of the data link. Over the link, the two computers could send each other files. It is possible for both computers to send signals to each other, permitting remote control of one computer over another.

Cables and wires are cumbersome. A wire stretching across town is an expensive option but we already have wires between most houses and offices – telephone wires. Unfortunately, while you and I can talk by telephone, computer data output cannot be input straight to the telephone system. For this, we use a modem which converts the binary 0s and 1s into a series of bleeps and blips, a little like morse code, which can be decoded at the other end of the modem link.

As with most things, modems vary in cost. Generally speaking, the more facilities a modem has the more expensive it is. The cheapest are simple manually-controlled units working at a single speed. Modems can operate at different speeds, ranging from 300 bits per second to 19,200 bits per second and beyond. Most modems in the U.K. work at one of four speeds:

300 baud	– where both the send and receive channels process data at 300 bits per second.
1,200/75 baud	– where one channel operates at 1,200 bits per second, and the other at 75 bits per second.
1,200 baud	– where data flows at 1,200 bits per second in both directions.
2,400 baud	– where data flows at 2,400 bits per second in both directions.

The astute reader will have noticed that the word baud appears in the listing. Generally speaking, the term bits per second is interchangeable with baud. There are exceptions, particularly when we go beyond 2,400 baud rates but the average user will probably never need to know this subtlety.

Like the word modem, baud originates from the States. Early British modem users, on the other hand, preferred to use bits per second, shortened to bps, as their measure of data speed. Many reference books still refer to bps in preference to baud.

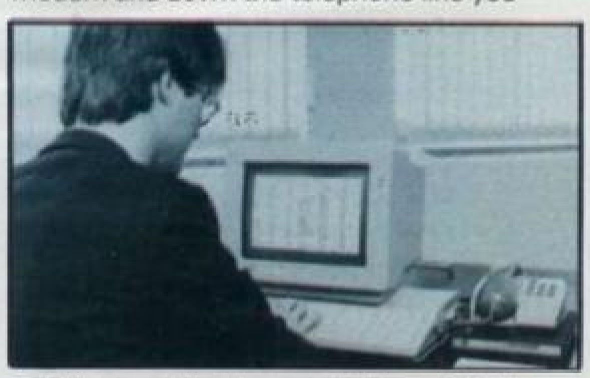
Many computers output and input their data via serial port. As the name implies, data is fed serially into and out of the computer to a variety of other units. They can range from another computer, a printer, or a modem.

Some computers, usually for reasons of economy, are not supplied with a serial port as standard. Such machines, notably the Amstrad CPC and PCW series, the Commodore 64/128 range, IBM PCs and compatibles and Sinclair Spectrum can usually be fitted with a serial port in much the same way most peripherals plug on.

Like most computer peripherals a modem works as an adjunct to the computer. In most cases, even after a computer has been equipped for communications, its work applications remain the same. Thus, even while the modem is connected to the serial port of your micro, it remains inert until suitable software is loaded and run. That prevents having to plug in the modem and set it up each time you want to use it.

Imagine your computer at home. If it is used for entertainment and educational purposes, without a modem and communications software, it is limited to the use of the programs you have in your personal collection. When connected through a telephone line to other computers, however, you have access to all the electronic games and other programs on the other computers as well, a much wider choice.

By sending messages through the modem and down the telephone line you



● **Using a modem to access Telecom Gold.**

can join a club which operates a remote bulletin board, a BBS. Through a BBS you can communicate electronically with other members. On some bulletin boards and company-run systems you can even shop in on-line catalogues and order the goods via you modem.

THE RISE OF MAIL

Electronic mail first arrived in the U.K. during the late 1970s. Based on the e-mail services seen on bulletin boards, the commercial e-mail services offer fast and secure transmission of e-mail at low cost. Other advantages such as, usually, local call access and multiple lines mean that the services are often cheaper and much more reliable to use than a single line BBS.

E-mail has progressed a long way since the late 1970s. Today's service providers now offer a number of extra facilities, some free, others on a pay-as-you-go basis. The extra facilities include an incoming and outgoing Telex bureau service, an outgoing fax service, gateways into other networks and on-line databases and access to the BT Telemessage service.

Sadly, not all e-mail services are equal. Nor is any single service able to provide all on the facilities mentioned. Competition being what it is, e-mail companies are constantly jockeying for new subscribers and offering new and more varied facilities to members, almost on a weekly basis.

There are three main contenders in the U.K. electronic mail market – Mercurylink 7500, One-to-One, and the brand leader, Telecom Gold. All three services are accessible at 300/300, 1,200/75 and 1,200/1,200 baud full duplex.

Mercurylink 7500 started life as the U.K. off-shoot of the highly-popular Easylink system in the U.S. Owned by the Cable and Wireless group, the Easylink network was re-named when Mercury Communications became a viable alternative in the communications market after British Telecom was privatised. Mercurylink is expanding rapidly. A subscription to the service costs £40, with discounts for extra mailboxes, plus a continuing monthly mailbox rental of £12.95.

E-mail is charged in terms of characters sent on the system, usually in blocks of 5,000 characters at a time. Unlike many on-line systems, Mercurylink does not charge users while they are connected to the system, since the monthly standing charge covers such charges.

Charges over and above the £12.95 all-in monthly rate are imposed only when text input to the system – 10 pence per minute – and additional services, such as the e-mail to fax and gateway services, are used.

LONDON

Like the other two e-mail networks in this feature, Mercurylink computers are based in London. Unlike One-to-One and Telecom Gold, however, no surcharges are levied for subscribers accessing the service from outside London. This is probably because Mercury Communications maintains a private data network over much of the U.K. That means that, for out-of-London users, Mercurylink has a cost advantage over the other two networks.

At the time of writing, Mercurylink has a value-added gateway into *The Financial Times* Profile information service. Other gateways are planned for the near future. The £12.95 monthly charge is designed to cover all connect time charges except when entering text into an electronic mail message. Heavy users are, however, surcharged for their use of the system. Forty free message units of 5,000 characters are included in the monthly mailbox charge. Above that, it costs 25 pence per 5,000 characters or part thereof to send text messages to other subscribers. In practice, few subscribers outside the major business organisations which use Mercurylink have to pay this extra per-message charge. Further details of the service from Mercurylink 7500, Mercury House, 1 Brentside Executive Centre, Great West Road, Brentford, Middlesex TW8 9DS. Tel: 01-847 6070.

Called originally Kensington Datacom in the early 1980s, after the company which founded the e-mail service, One-to-One first received its curious name when, in 1985, Pacific Telesis, a major U.S. firm, bought into the then fledgling company. In recent months Pacific Telesis has sold its interest in the company to a relative unknown in the on-line market, Comtext International.

With about 10,000 subscribers – like most e-mail companies One-to-One is very coy about its subscriber figures – One-to-One has several gateway and value-added services, including a bulletin board and financial reference service. The BBS facility is available at normal rates, while the financial database is surcharged at £1.50 a minute.

A subscription to One-to-One costs £50, with discounts available for multiple mailbox rentals. There are several free signing deals available, provided you buy a modem at the same time. No monthly standing charge is imposed but a minimum billing of £5 has much the same effect. Thus, whether you use the system for 10 or 50 minutes in a given month, the £5 cover charge is imposed.

On-line charges are a flat rate 10 pence per minute, regardless of the time of day or night you use the system. Access is provided on all popular modem speeds – 300, 1,200/75 and 1,200/1,200 baud – via London dial-up, as well as several of the more esoteric baud rates, including north American modem speeds and ARQ error-correction. Access is also available from a standard Telex terminal.

SURCHARGE

Out-of-London subscribers may, like Telecom Gold, access the One-to-One service via the BT PSS service at a surcharge of three pence per minute. One-to-One allows subscribers to use a special pre-paid ID when accessing the service, so no extra charges other than a local telephone call or prior arrangements are necessary. Further details of the service are available from One to One, Scorpio House, 102 Sydney Street, Chelsea, London SW3 6NL. Tel: 01-351 2468 or LinkLine 0800-800-121.

Set up in the early 1980s, Telecom Gold

E

MAIL

SUPREMACY

E-MAIL WILL NOW PROVIDE FAX AND TELEXING SERVICES AS WELL AS STANDARD MESSAGES, ALL FOR A REASONABLE PRICE.

has several computers around London, some directly under its control, with others run by other service providers. One service provider which has deliberately set out to service the needs of the home and small business user of Telecom Gold is MicroLink.

At the time of writing, Telecom Gold is in a state of flux. Many subscribers are charged a per-minute access charge, along with a data sent and received charge. As a general rule of thumb, peak access works out at 15 pence a minute, while off-peak access works out at five pence a minute. The charges may vary downwards depending on the speed of access and/or the volume of data transmitted.

```
23421920100472+COM

Welcome to Telecom Gold's System 72

Please Sign On

>ID MAG066

TELECOM GOLD Automated Office Services 18.4X(72)

On At 20:26 22/01/88 GMT

Last On At 20:24 22/01/88 GMT

--------------    ---------    --------------
Now you can       Use your     Telesoftware
book to the       micro to     Library: see
London shows      set type     new programs
--------------    ---------    --------------
 Key TL            Key TP           Key TS

        *********************
******* M i c r o L i n k *******
        *********************
   (c) Database Publications

Welcome! You are now linked to the
MicroLink computer at Telecom Gold

 HELPLINE: MAG999 or 061-434 0672

  Key MM for full MicroLink Menu

>MM

BB .... Bulletin Board                   BR .... British Rail
EE .... Electronic Mail                  EG .... Exhibition Guide
FL .... FloraLink                        GT .... Golden Tips
GW .... Gateways from MicroLink          LF .... Legal & Financial Advice
LL .... LoadLink                         MU .... MicroLink Users
NB .... NewsBytes                        NL .... MicroLink Newsletter
PP .... MemoPad                          RR .... Press Reviews
SI .... System Information               SS .... System Setup
ST .... Statistics                       SW .... Shop Window
TL .... Theatre Link                     TM .... Telemessages
TP .... Typesetting                      TS .... TeleSoftware
TT .... Telex                            WL .... WeatherLink

Enter the letters of your choice         These can be used at any > prompt

Enter HELP xx for further details        Also HELP INFO and HELP CMDS

>
```

INTRODUCTION

Prior to the introduction of the complex new charging system – October, 1987 – Telecom Gold charges were calculated on the basis of 3.5 pence off-peak and one penny peak per minute charges. The introduction of high-speed modems is blamed for the slight increase in charges.

One Telecom Gold service provider has kept the old charging structure in a bid to hold on to and gain more home users of Telecom Gold. That service is called MicroLink. A subscription to MicroLink costs £5. Several modem/subscription deals are available, including a 300/300, 1,200/75 and 1,200/1,200 baud Hayes-compatible modem for £169 including VAT.

On top of the initial registration fee, a monthly standing charge of £3 is imposed. The fee covers the costs of extra services available on MicroLink and not seen on other Telecom Gold systems – telemessaging, telesoftware and so on.

The old Telecom Gold charging structure is used on MicroLink – 11 pence Monday to Friday 8am to 7pm, 3.5 pence all other times. This is cheaper than the new Telecom Gold charges. Out-of-London access via a pre-paid PSS account adds an extra three pence per minute to the charges. A plethora of other services is available on and through the MicroLink computers, ranging from a continually-updated news service, free telesoftware and a free help-line facility.

From the business point of view, gateway access to several services, including U.S. networks, is available on a pay-as-you-go basis. Standard Telex bureau facilities are also available.

Further details of the service are available from MicroLink, Europa House, Adlington Road, Macclesfield, Cheshire. Tel: 0625 878888.

SIT UP AND TAKE NOTICE

Like the old school bulletin board, sometimes called a noticeboard, a computer bulletin board is an interchange point for information and ideas. The facilities available on a bulletin board system vary from simple messaging – electronic mail – to the uploading and downloading of text and program files.

The uploading and downloading of computer software has done more to promote BBSs around the world than any other factor. The software is not, as you might think, illegally-pirated versions of commercial software. Instead, software authors who have developed their software for specific applications yet do not wish to sell it donate their software creations into the public domain.

If the aspiring software genius is after some cash for his endeavours, an option exists to place the software into the shareware domain. At its simplest, the shareware concept allows people to copy, either by disc or by modem, the software and give it to others. If the recipient likes and uses the software, he is honour-bound to pay the software author a small fee – typically £20-£30 – for which he gets software support and upgrades free or at very low cost.

Running a BBS takes a good deal of time and, not least, a little money. Most U.K. BBSs are run by computer enthusiasts who have delved into the world of computer communications and, for various reasons, decided to set up their own on-line systems. To repay their efforts, some BBS system operators – Sysops – make a modest charge, between £5 and £25 a year, for use of their systems. The money is usually ploughed back into the BBS to improve facilities for subscribers and to obtain the latest shareware and public domain packages from exotic locations.



● G-forces at work on a sample screen from The Gnome at Home.

BULLETIN BOARDS PUT YOU IN TOUCH WITH LIKE-MINDED USERS.

CATEGORIES

As a rule, bulletin boards fall into two categories, scrolling ASCII and viewdata. The two terms are not as awesome as they sound. Scrolling ASCII means that data is fed from your modem on to your computer screen in a sequential manner. As data feeds from the bottom of the screen, so data scrolls off the top of the screen. The term ASCII is the official name for seven-bit data. Scrolling ASCII systems usually use an 80-column width of characters. Viewdata BBSs, on the other hand, use a 40-column screen, with large colourful characters like those seen on Ceefax and Oracle, the TV teletext services. As with teletext, viewdata is presented in TV screen-sized portions of data, usually measuring 40 columns by 20 lines. As each screen is completed, so the screen is cleared on request and the next screen appears.

Those differences, though subtle, combine to make scrolling ASCII systems largely incompatible with viewdata systems. Just as the system software needs to be different to shoot the data down the distant telephone line, so the communications software required by these two on-line formats differs radically. Generally speaking, most communications software usually supports both scrolling ASCII and viewdata formats.

Let us look at a real live BBS. One of the most popular systems in the U.K. is the London Underground. Named after the famous Tube system, the London Underground BBS runs on an Amstrad PC1512 with a fitted hard disc, driving into a Miracle Technology WS3000 modem.

UNDERGROUND

The London Underground is accessible on a single London number – 01-863 0198 – and can be called at almost any popular modem speed, including 300, 1,200 and 2,400 baud duplex, as well as the 1,200/75 baud rate favoured by Prestel and other viewdata systems. As you can see from the extracts from the BBS, the London Underground is a scrolling ASCII system.

Another BBS, situated elsewhere in north London, is The Gnome at Home – TGAH. This oddly-named BBS is run by Glyn Philips, otherwise known as The Gnome. He started TGAH as a special fun column on the British Telecom Prestel service. When in 1985 Prestel entered its sixth year of service Philips took his column off Prestel and transferred it to his own BBS.

SERIES

TGAH runs on a series of BBC Model B micros, all linked with Econet, the BBS local area networking software. Thanks to those parallel machines, TGAH is accessible on several modems, the public number for which is 01-888 8894.

Like the London Underground, TGAH charges a modest fee for regular subscribers. Unlike The Underground, however, TGAH is available to the public, with certain features, notably personal mailboxes, available only to paying subscribers. Philips charges £1.50 a month for a subscription to TGAH.

TGAH is a viewdata BBS, which reflects the fact that The Gnome's board column was available originally on Prestel. The BBS provides a range of services, from electronic mail, downloadable software and a weekly computer newsletter.

A MIGHTY GOOD READ

PRESTEL, WITH MICRONET AS ITS MOST POPULAR SERVICE, PROVIDES MORE THAN 250,000 FRAMES OF DATA.



● An opening menu on Micronet.

Perhaps one of the best-known on-line services in the U.K. is Prestel. Designed in the late 1970s as what proved to be an interactive version of Ceefax and Oracle, the U.K. TV teletext systems, Prestel has undergone a metamorphosis taking it into and beyond the bulletin board concept.

Prestel has a general news, information and weather service which operates on a very similar basis to the Ceefax and Oracle services most people see on their TV sets. The difference with the service is, of course, that Prestel has several thousand times more pages than both the U.K. teletext services together.

In total, Prestel has more than 250,000 frames of data on its system. Each frame is a single teletext-style screen of information, consisting of 40 columns by 20 lines of eight-colour graphics and text. Again, the format is very similar to the U.K. TV teletext services.

Overlaying this general information service are a number of industry/group-specific areas, covering topics such as the financial trade – Prestel Citiservice; the travel industry – Prestel 747; and the home and small business computer user – Micronet 800.

MICRONET 800

Micronet 800 is perhaps the most interesting area for readers. Spanning more than 30,000 frames of Prestel, Micronet 800 set out originally to be an electronic version of a computer magazine when it was launched in 1983. Micronet is changing constantly and evolving to meet subscribers' needs. It provides a daily on-line news service, as well as the expected machine-specific databases. Added to this is the popular *Shades* multi-user game, a free and chargeable telesoftware section and a range of chatline services. It is not difficult to see why Micronet 800 has become so popular with its users.

One of the most popular areas for users is the chatline. As with bulletin board messaging, users can create their own messages on a special frame known as a response frame in Prestel parlance. By sending this frame to the Prestel computer, the message can be uploaded to all the other Prestel computers on the network. Within seconds of a message being sent by a user, it is available for reading by other Micronet subscribers all over the U.K.

SINGLE MESSAGES

Since Prestel is a devolved on-line service – there are six Prestel computers around the U.K., each updated from a central service computer known as the Duke Update centre – the Micronet chatline service had to be capable of taking single mesages and shuttling them round the network for all users to see.

The backbone of the chatline updating facility is called Prestel mailbox. Whether a user sends a message for broadcast over all the Prestel network or a single electronic mail item for private reading by a single subscriber, the Prestel mailbox system handles the message. Mailbox enables an electronic message – mailbox – sent by one subscriber on one Prestel computer to be received by another subscriber on the same or another computer elsewhere in the country.

To do so, Prestel uses a central electronic mail computer called Pandora which draws messages from Prestel computers as they are sent. As each user logs on or off, so Pandora is polled and any messages waiting are summarised on the subscriber's screen. Messages can then be read individually and stored or forwarded to other subscribers as required. At any time during a call to the Prestel system, a subscriber can, of course, poll Pandora to see if any messages are waiting.

Micronet also provides a number of other services to its subscribers, notably Softshop, a mail order software purchase service. The service normally sells any computer software which is not available for downloading on the system. Usually, however, most popular games and utility software is available for download from the system at discounted prices. A typical program takes about five minutes to download.

Prestel is accessible on a local telephone call basis from all areas of the U.K. This factor, combined with free access outside business houses, makes Micronet a very cheap source of entertainment for computer and modem users.

On its own, Prestel costs £6.50 per quarter to subscribe. Micronet 800 subscriptions add a further £10 to this figure. There is no registration fee to pay, but using the system between 8am and 6pm Monday to Friday, and 8am to 1pm on Saturday incurs a business charge of six pence per minute, so most Micronet members tend to use the service outside those hours.

BAUD RATES

Prestel is available at 1,200/75 baud, although plans are in hand to allow access to 300/300, 1,200/1,200 and 2,400 baud full duplex over much of the U.K. by the end of the year. This is part of British Telecom integration of the Prestel and Telecom Gold electronic mail networks. Once complete, the network will be called Vascomm, although both Prestel and Telecom Gold will retain their separate corporate logos. Further details of Micronet 800, as well as the basic Prestel membership, are available from Micronet 800, Telemap Ltd., Durrant House, 8 Herbal Hill, London EC1R. Tel: 01-278 3143.

Micronet can provide a free demonstration ID and local telephone number to try the service before you subscribe. The service also has a free modem offer to subscribers willing to pay their first year's subscription – £166 – in advance. A number of the other modem offers are also available.

HOOKED ON-LINE TO A MUG, YOU NEED NEVER BE ALONE IN AN ADVENTURE AGAIN.

MUG SHOTS

Just as text-based adventures on micros have proliferated in recent years – witness the success of *Zork* – so on-line adventure systems have been highly successful, too. On-line adventure systems have been around since the earliest days of computing and modems. The first on-line adventures were written for mainframes such as the DEC-10 at Essex University.

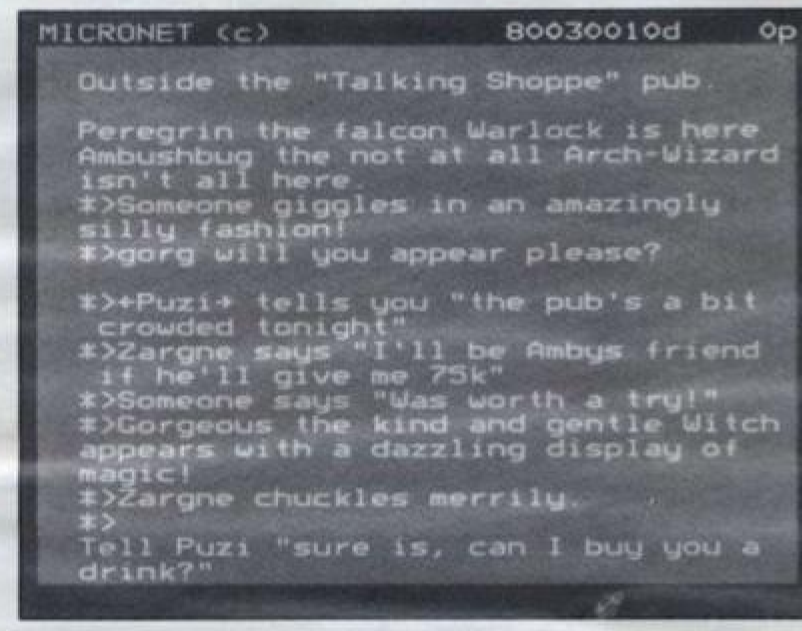
Essex University was the first site where an on-line adventure system was opened to the general public. Such was the success of the *Multi-User Dungeon* – MUD – adventure which ran on the University DEC-10 that the university authorities were compelled to curtail MUD activities to unsocial hours, usually to between midnight and 6am each day.

MUD was, and still is, the multi-user game by which other on-line adventures are measured. MUD was written by Roy Trubshaw, an undergraduate at the university in 1979. In 1980 another undergraduate, Richard Bartle, expanded the game and revised its command structure into the MUD we know today.

MUD success was little short of phenomenal and licensed versions of the game appear on Compunet, the Commodore 64 on-line network and Compuserve, the giant on-line system in the U.S. In the last few years Bartle teamed with Simon Dally, a computer entrepenuer, to form MUSE – Multi User Entertainment Limited – which provides MUD II on a British Telecom computer, accessible via direct dial in London, or via the BT PSS service in return for a modest hourly fee. Starter kits for MUD II cost £4.95, which entitles you to a user ID and a manual, plus maps and other documentation.

CHARGES

Usage charges on MUD II vary depending on the number of MUD credits for which you contract to use and pay. Prices start at £1 per hour and reduce to as low as 50 pence per hour if a large enough quantity of credits is purchased. The scenario of the game is similar to that found in most on-line adventures – a mystical land with goblins and dwarfs to help or hinder your progress. There is an underground kingdom, a sea and an island. Players can become lost in forests or graveyards, drink poison and even fall from cliffs.



● **Sample screen from *Shades*, the multi-user game on Micronet.**

The object is to amass as many points as possible, taking you through a total of 10 personal levels – novice, warrior, champion, hero, super-hero, enchanter, sorcerer, necromancer, legend and wizard. Points are awarded for a variety of reasons, usually due to the collection of treasure, which is then dropped unceremoniously in the swamp.

BUNNY RABBIT

Other point-amassing activities range from smashing a poor innocent young bunny rabbit over the head, causing it to whimper before dying, to assisting your fellow players in their travels. Some activities are, it has to be said, a little unusual, but are in keeping with the alternative comedy and thinking theme which pervades the game. Further details of MUD II are available from Multi-User Entertainment Ltd., 6 Albemarle Way, London EC1V 4JB. Tel: 01-608 1171 (voice), 01-608 1173 (data).

Another highly popular MUG is *Shades*, which is accessible on a gateway basis via the BT Prestel viewdata network. Unlike MUD, which is standard scrolling format, Shades uses the viewdata format to display the game in progress.

EIGHT GAMES

Again unlike MUD, which is a single game in which players cavort and score points, Shades is eight games, to which up to eight players are allocated on a random basis.

It means that it is possible for a player to leave the game to put on the kettle and, on logging-in again a few minutes later, be greeted with the same game but a differing set of players.

The reason for the multiple game-playing environment of Shades is simple; it prevents the games getting too crowded and the treasure being used too fast.

Shades costs 99 pence an hour to play over and above normal Micronet connect time rates. The Shades service is, incidentally, available to non-Micronet members at a flat rate of sixpence a minute in addition to normal Prestel connect time rates.

AMIGA ANCO ST

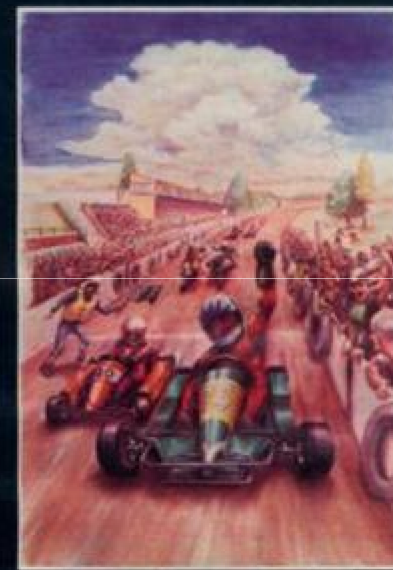


GRID START
Race your 6 gear FORMULA 1 car with Booster against 23 other cars over 6 world famous circuits. Practice long and hard before you even enter the Novice class.
AMIGA £9.95



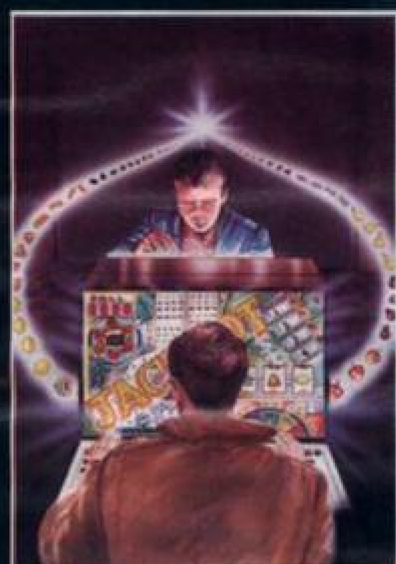
KARTING GRAND PRIX
GO KART racing is great fun but requires skill and experience in the selection of Sprocket size and tyres to suit the track, weather conditions and style of driving. Practice or Compete over 8 tracks. 1 or 2 players.
ST & AMIGA £9.95





LAS VEGAS
You have $5 and a burning ambition to break the bank at LAS VEGAS. Play SLOTS with the very latest features, HIGH OR LOW and finally the BLACK JACK table to realise your ambition.
ST & AMIGA £9.95







XR 35
Eight sectors of fast shooting against numerous enemies moving fast in ever changing patterns, ready to annihilate your super manoeuvrable ship. Multi plane scrolling background.
AMIGA £9.95











JUMP JET
A chance to fly a unique and complex fighting machine. When you have mastered hovering and approaches, accelerate the Jump Jet into attack. Use the radar to seek and destroy the enemy. Locating the carrier and landing in rough seas and strong cross winds is another matter.
AMIGA & ST £14.95

STRIP POKER 2
A sizzling evening of Poker with Samantha and Donna is in store for you.
AMIGA & ST £9.95



TRIVIA TROVE
A game for the whole family. Questions on Sports, Science, Books, History, Music, Pot Luck, Films and Maths.
AMIGA & ST £9.95



FLIGHT PATH 737
An Advance Pilot Trainer, the program takes you through the most interesting aspects of flying. Take off and climb over mountain ranges then attempt a safe landing. Six levels of addictive flying experience.
AMIGA & ST £9.95

ANCO SOFTWARE LTD, 35 WEST HILL, DARTFORD, KENT DA1 2EL
TEL: 0322 92513 MAIL ORDER HOTLINE: 0322 522631 FAX NO: 0322 93422
PAYMENT BY CHEQUE, P.O., VISA OR ACCESS

COSTING A PACKET

Although you might not think so, international communications is a very popular computer hobby in the U.K., because the cost of contacting international networks, particularly those in the States, is less than you might think. Most international voice calls are connected over the public switched telephone network. International PSTN calls to the U.S., as an example, cost close to £1 a minute during peak rates.

Several telephone companies, including British Telecom and Mercury in the U.K., have devised a special network to connect computers. Such networks are called packet switching systems. The U.K. data networks are known as PSS – the British Telecom Packet Switch Stream – and MPDS – the Mercury Packet Data Service.

Both systems keep down costs to between 10 and 15 pence a minute by splitting the sent and received data into small packets of data, each conforming to an international standard.

Technicalities aside, this allows several modem calls to occupy a single virtual telephone or simple data circuit to anywhere else on the network. Because of the use of packets it is possible for outgoing modem data to be sent over one route, with the return data coming back over a different route.

With packet data technology, call costs for international modem calls are reduced dramatically to a small percentage of the equivalent voice-connected modem call. Such are the savings from using packet switching technology that it is usually cheaper for a long-distance U.K. modem call to be completed over PSS than by dialling direct.

In the main, however, packet data services are used for international data calls. Many major users, usually the host computers, are hooked directly into the packet data networks. For the small and/or occasional user of such networks, dial-up access at 300/300, 1,200/75 and 1,200/1,200 baud is available.

Because packet data systems conform to an internationally-laid-down set of rules, the networks can bypass the modem standards of a particular country. Thus, while a U.K. modem user may not be able to dial up and log on to a particular on-line service in the U.S. he will find it very easy and much cheaper to call the service via a packet data network.

PSS costs £40 to sign and £10 per exchange per quarter to use. Mercury MPDS costs £15 to sign and £10.50 per quarter to use. The charges exclude any usage charges which may be incurred. MPDS is about 20 percent cheaper to use than PSS. Details of packet switching services can be obtained from the following addresses:

British Telecom Packet Switchstream, 1-6 Finsbury Circus, London EC2M 7LY. Tel: 01-920 0661 or Linkline 0800 282852.

Mercury Packet Data Services, Mercury Communications, 1 Brentside Executive Centre, Great West Road, Brentford, Middlesex TW8 9DS. Tel: 01-847 6070.

> *"While a U.K. modem user may not be able to dial up and log on to a particular service in the U.S, he will find it very easy and much cheaper to call the service via a packet data network."*

THE ADVENT OF PACKET SWITCHING SYSTEMS HAS MADE HOOKING ON TO AN INTERNATIONAL ON-LINE SYSTEM MUCH CHEAPER.

Computer owners in the U.S. enjoy a market which is much cheaper and more prolific than in the U.K. Just as computer prices are much keener, so modem and on-line database prices are much cheaper in the U.S. The result has been that there are now a number of vast on-line systems available in the U.S., all accessible for a few dollars an hour and each containing hundreds of gigabytes of news, information and programs.

While computer news is always interesting, downloadable programs are even more interesting, particularly since, as is the case with U.S. on-line software, many of the programs available are of equal or superior quality to commercial software on the market.

Like BBS telesoftware, almost all the software available for downloading from the U.S. on-line networks is public domain or shareware. That adds considerably to the appeal of accessing U.S. networks for downloading software. An hour spent on-line to a U.S. network such as American Peoplelink will work out at around the £10 mark. If software is downloaded, the figure rises to about £12 because of the increase in data transmitted over the international packet data network.

Considering that it is possible to download several hundred kilobytes of program data during this time, a typical PC user can get three or four really good programs for £10. Granted such programs might be available from a local PC user group but the software is available 24 hours a day from the on-line services, as well as being the latest version.

U.S. on-line systems

American Peoplelink

Time charge	£3 per hour 24 hours a day – to U.K. users
Sign-up	$10.
On-line software	For most computers.
Features	Partyline (CB). A very good mail system. Sigs with databases for programs.
NUA	A9311031200070 or A93106*DPLINK
Contact	0101-312-870-5200

Byte Information eXchange (BIX)

Time charge	$12 peak times (U.S.). $9 offpeak
Sign-up	$37.
On-line software	Yes, but slow; downloads via Tymnet connections.
Features	Excellent computer news service to augment *Byte* magazine news
NUA	A9310600157800
Contact	0101-603-924-7681

Compuserve

Time charge	$6.25 per hour at any time via PSS or MPDS
Sign-up	Starter kits $25 includes $10 on-line time.
Subscription	$10 per month extra for overseas billing address.
On-line software	Yes, for most computers.
Features	The biggest of the American systems and the first to introduce a CB simulator. Sigs for computers and professional groups. Electronic mail. Subscribers are allocated 128K of free storage. Several on-line games.
NUA	A93132
Contact	0101-614-457-8650

Mnematics

Time charge	Free for U.K. users.
Sign-up	Free for U.K. users.
On-line software	Yes, in Sigs.
Features	A wide range of sigs with software databases. Real-time chat subsystem. News service from Associated Press.
NUA	A9311091400050
Contact	0101-914-365-0184

Modem City

Time charge	$1.50 per hour for U.K. users – 70 percent off U.S. rates.
Sign-up	$25.
Subscription	$5 min. invoice in months the service is used.
On-line software	Yes – notably Apple, MS-DOS, Coco and Tandy Model lap-tops.
Features	StreetTalk (CB). Mail which can load files stored on the system. Mostly used by American school teachers.
NUA	A9311040100612
Contact	0101-617-757-6369

The Source

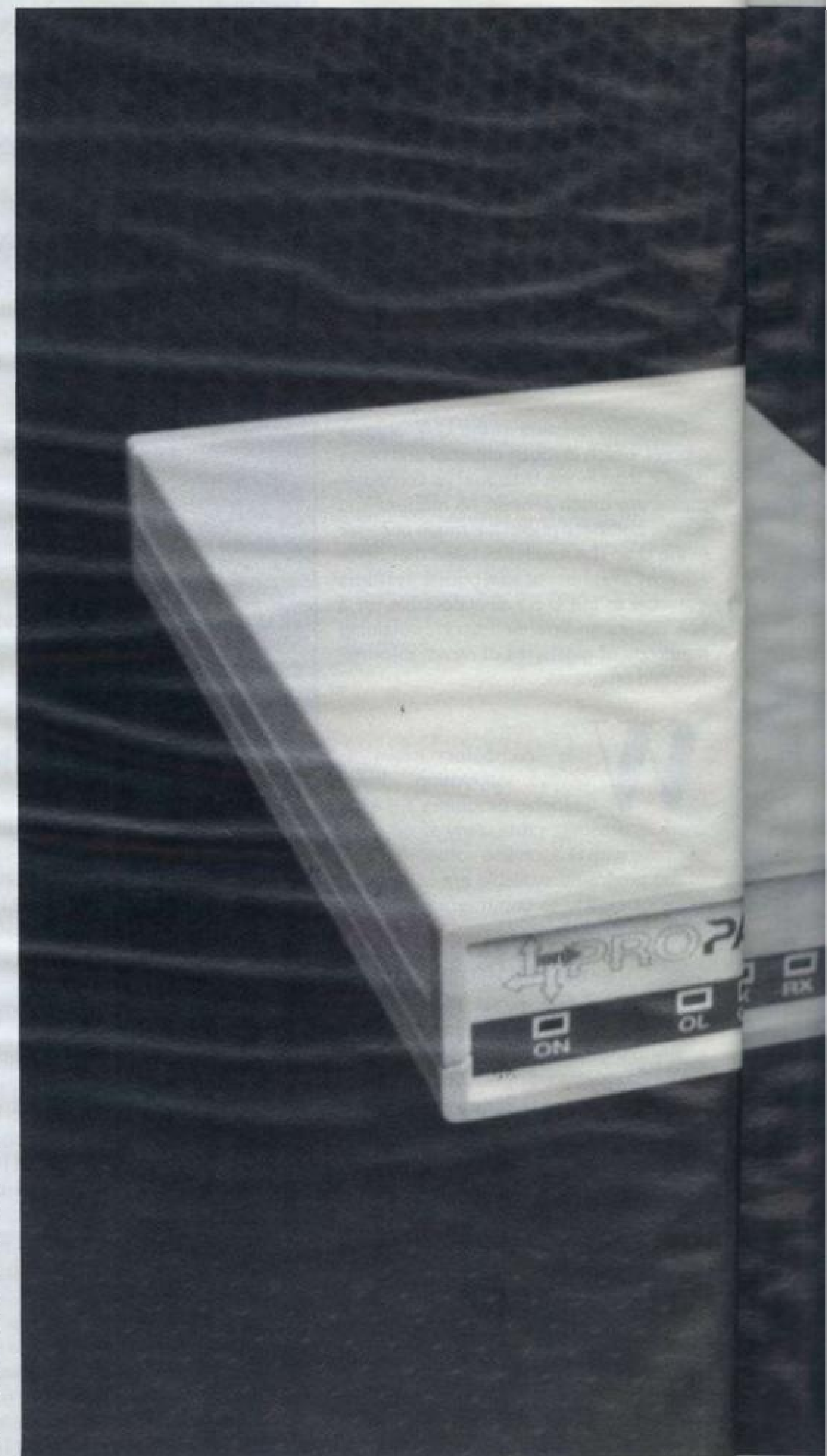
Time charge	$7.50 per hour after 6pm U.K. time – 300 baud.
Sign-up	$30.
Subscription	$10 per month min. invoice – includes $9 on-line time.
On-line software	Yes in sigs and for sale.
Features	A news service with keyword search databases. Chat (CB) has now been added. Most users in the high income and business category.
NUA	A9311030100024
Contact	0101-703-821-888

THE COMPLETE

OUR SPECIAL FEATURE SHOULD HAVE WHETTED YOUR APPETITE. NOW YOU CAN WIN A COMPLETE PACKAGE TO START YOU IN THE FASCINATING WORLD OF COMMS.



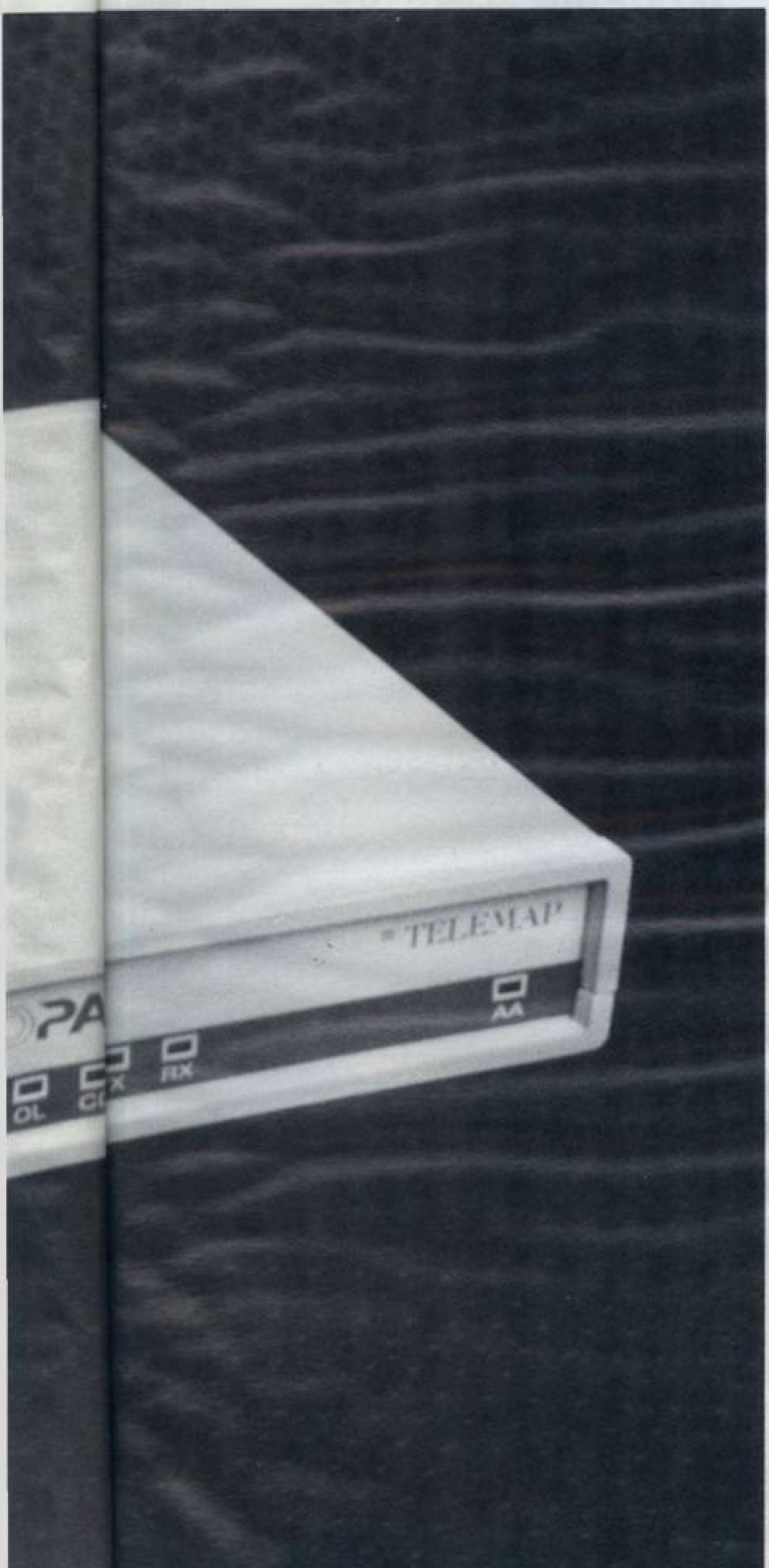




• Right: The ProPak modem, the essential interface between your computer and your telephone. Top: The index screen to the Micronet on-line service. Above: The price includes 20 hours of free playing-time on Shades.

COMM-PETITION





Our generous patron this month is Telemap with whom we have collaborated to bring you a special competition marking the occasion of our comms special.

The prize for the lucky winner of our competition is the Telemap Professional Package. It consists of the ProPak modem – a BABT-approved, Hayes-compatible intelligent modem supporting auto-dial, V21 and V23 standard protocols, the relevant machine-specific software, connecting cables and a year's subscription to Micronet, Prestel and Telecom Gold. As a special bonus, Telemap is throwing in 20 hours of playing time on Shades.

Telemap is the company behind Micronet, the on-line microcomputing service with over 35,000 pages of information. Micronet offers daily computer news, software and hardware reviews, hints and tips and many other articles. Interactive services include Telesoftware, e-mail, telex, celebrity interviews, chatlines, multi-user games (the celebrated Shades), a gateway to Telecom Gold (Interlink) and technical support for home and business machines.

The competition is simplicity itself. Listed below are four acronyms or abbreviations concerned with the world of comms. All you have to do is say exactly what they stand for. Write your answers on the competition form, specify which type of computer you own and return the completed entry to: Comms Competition, Your Computer, Greencoat House, Francis Street, London SW1P 1DG. All entries to arrive by April 21st.

The four acronyms or abbreviations we want written in full are:

A) Sysop C) PSS

B) MUG D) Kermit

Answers: A)

B)

C)

D)

My machine is:

BBC
IBM PC-compatible
Amstrad PCW
Amstrad CPC
Atari ST
Commodore Amiga
Commodore 64/128

Name ....

Address ....

....

....

line noise

Communications

WORMs at Videotex





Punters at Videotex '88 – the early birds to get the WORM?

Called previously the Videotex User Exhibition, this year's videotex industry showpiece at the Barbican Centre, London was re-named Videotex '88. As usual, the show had examples of companies from all sectors of the industry, from small software houses selling budget viewdata host systems to the larger hardware specialists showing the latest videotex technology.

Videotex is about storing and presenting large quantities of information via networks, usually via the telephone, though broadcast data, e.g., teletext also falls under the collective videotex term. Data storage is a perennial videotex problem. The entire Prestel 350,000-page database requires 1K of hard disc storage per page, meaning the database alone needs 350MB of store.

On top of that there is system software and what about back-ups? Hard discs are being stretched to the limit by some videotex systems and reliability can occasionally be a problem. Two companies at the show were talking seriously about Write Once Read Many times disc stores, a form of laser disc which works like an EPROM – in other words the medium can be programmed gradually until it is filled.

The advantages are that a single laser disc will hold hundreds of times the amount of information the average hard disc can store and there is only a very small access speed penalty. WORM drives are expected to become very competitive with conventional hard discs once they become established, with gigabyte units being offered for videotex applications costing £2,000.

WORM disc storage will probably become very popular in France where there are now more than three million installed videotex terminals attached to the state-run Teletel network.

The show had a preceptible buzz about it with many companies confidently expecting other countries to follow the French videotex lead to varying degrees, thus opening the market in a big way.

GEC applications group general manager Rupert Soames predicted that videotex is approaching a watershed in its history as the world's telephone companies approach decisions on making videotex available to the public cheaply and thus plentifully, as the French have already done. British Telecom has been investigating and costing equipment for mass installation of a system to match Teletel and, with gateway accessibility to the national Directory Enquiries database becoming a reality on Prestel in April/May, a massive videotex industry surge is expected in the next 18 months.

Besides national videotex optimism, it is clear that smaller private viewdata systems are becoming increasingly popular in their own right. Travel agents are no longer the mainstay of viewdata and, despite critics who say the Prestel-based viewdata standard is old-fashioned and limited, more new systems were on show at Videotex '88 than ever before.

Most of them are doing things well on micros these days. Metrotel, Communitel, Micro-Technology and Owl Micro-Communications are all offering multi-user host viewdata systems with

news from Ian Burley

impressive specifications running on such modest hardware as BBC Micros and IBM PCs.

Y2 Computing was displaying its slick Ruby-Tel host system running on an Amiga 2000 which can support up to 16 users simultaneously. Gateway links into other small systems or even into the big national systems are also being offered for a few thousand pounds. Compared to two years ago, the relative lack of minicomputer host equipment at the show was startling.

What of the future? Until everything is cabled completely with fibre optics there will be a limit to the rate at which data can be transmitted down ordinary telephone lines reliably. This means that video-telephones and photo-videotex are still a long way off. Two years ago it was all the rage to show a photo-videotex development project. This year only Tandata appeared to be pushing photo-videotex – a viewdata-like display database which can incorporate digitised colour photographs – and its system does not use telephone lines. Instead, Tandata is concentrating its efforts on the potentially much more lucrative cable TV technology and has produced an interactive video/viewdata terminal and decoder, Genie.

Viewdata terminals on show were a far cry from their forebears of not long ago. The latest units from Tandata, Sony and Bishopsgate are sleek designs with PC-like quality keyboards and high-resolution compact monitor displays. Gone are the adapted television sets with makeshift numeric keypads of yesteryear.

On-line banking was also much in evidence. Home banking pioneer the Bank of Scotland had competition for the first time from Clydesdale Bank, which was publicising its TeleBank service launched last year.

Finance-orientated businesses are relying more and more heavily on comms and the show featured a proliferation of terminal packages for IBM PCs, e.g., *Multicomm, Procom*, and *Vicom*. Infoline reinforced the trend, showing its company reference and credit search database service. Specially-customised terminal packages configured for Stock Exchange monitoring were also spotted.

Although Videotex '88 showed visible technological advances, the show was modest. That is explained partly by the notable lack of the mainframe and minicomputer companies which used to dominate the event.

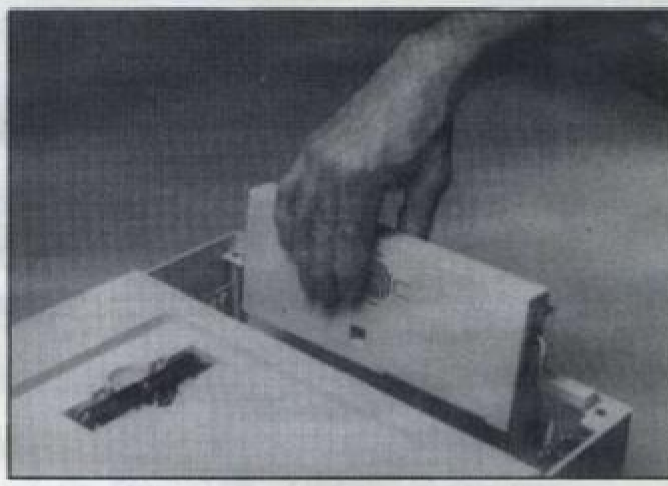
• • • • • • • •

Amstrad unveils modem at Which?

The Which Computer? Show was a busy time for Amstrad with the launch of the attractive new PPC luggable PC-compatibles. As we predicted, the higher-end PPC640 machines feature, as standard, an impressive V22bis – 2,400 baud – compatible multi-speed Hayes standard integral modem.

The much-respected, Procomm-derived, Mirror II scrolling/viewdata comms package is bundled, too. The single drive PPC640 costs £499 plus VAT, cheaper than some examples of V22bis modems on their own.

A similar specification PC card modem, the MC2400, was unveiled and will sell for £199 plus VAT. All the modem-equipped PPC machines gained BABT approval on the first day of the show.



● ***The Amstrad MC2400 will cost £199 plus VAT.***

Amstrad is next expected to unveil a free-standing version of the V22bis modem of the serial port variety, allowing use with virtually any micro. After sending down PC prices to affordable levels with the PC1512, Amstrad looks to be doing the consumer another price favour, this time in the all-too-inflated modem market.

• • • • • • • •

Microlink emulates Micronet offer

Following in the footsteps of Micronet, which last month unveiled its Propak £199 plus VAT Linnet modem plus comms terminal and subscription package, Microlink, the Telecom Gold service run by Database Publications, has announced its own modem-based special offer.

There are two levels of pricing, the entry level being £99. The package consists of a V21/23 – 300 and 1,200/75 baud – modem, lead and comms module from the Database Mini-Office II WP/calcsheet/databases package. Also included is free registration to Microlink and Telecom Gold, plus a month's free connect time to the system. The alternative is a £169 package which substitutes the modem with a V22 – 1,200/1,200 full duplex – Hayes-compatible model. The special offers are available initially to BBC Micro and IBM PC owners. More details from Microlink on 0625 878888.

• • • • • • • •

Miracle of speed moves company into business market.

Miracle Technology has placed itself firmly in the upmarket business comms market with its announcement at the Which Computer? Show of three new modems capable of data speeds between 4,800 and a staggering 14,400 bits per second. The three models are the 144DP which offers 14,000, 12,000, and 9,600bps on leased four-wire telephone lines; the 96 DP, offering 4,800 and 9,600bps upgradable to the 144DP; and the 96 FT – Fast Train – which is BT4960 modem-compatible.

The modems are aimed at multi-installation, point-to-point private networks and so Miracle has provided inter-modem diagnostics on the DP models. Should line quality fail, or fall below satisfactory standards, there is provision for automatic switching to Public Switched Telephone Network voice lines at 2,400 baud.

STORT SOFT

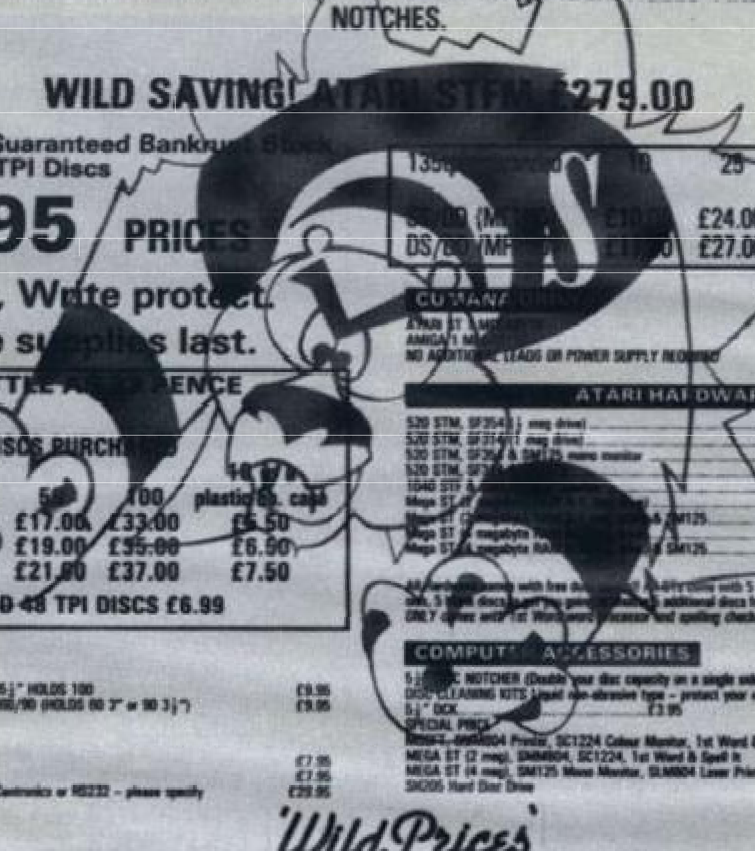
A breakthrough in software supply

Just write for more information. Cheques etc. payable to STORT SOFT (International orders add 10% and remit in pounds Sterling by bank draft or international money order. Write for quote in any other currency)

☎ 0279 89509 ACCESS/MASTERCARD/EUROCARD/VISA accepted. CREDIT CARD ORDER LINE – 0279 89509 24 HOURS A DAY, 7 DAYS A WEEK. VAT & P.P. INC. NO HIDDEN EXTRAS. WHAT YOU SEE IS WHAT YOU PAY 0279 89509 ☎

18 CROWN CLOSE, SHEERING, BISHOP'S STORTFORD, HERTS CM22 7NX

ALL DISCS CARRY A NO QUIBBLE REPLACEMENT GUARANTEE, ARE CERTIFIED 100% ERROR FREE AND COME WITH LABELS, 5¼" ALSO HAVE SLEEVES AND WRITE PROTECTS. FLIP SIDED DISCS HAVE TWO INDEX HOLES AND TWO NOTCHES.



WILD SAVING! ATARI STFM £279.00

Special purchase of Certified & Guaranteed Bankrupt Stock
100 DS/DD 48TPI Discs

WILD £29.95 PRICES

Inc Sleeves, Labels, Write protect.
Limited offer while supplies last.

135[illegible]	10	25	50	100	500	10 in a case
SS/DD (MF[illegible])	£10.[illegible]	£24.00	£47.00	£92.00	£399	£12.95
DS/DD (MF[illegible])	£11.[illegible]	£27.00	£53.00	£99.00	£429	£14.95

CUMANA [illegible]
ATARI ST [illegible] £139.00
AMIGA [illegible] £129.00
NO ADDITIONAL LEADS OR POWER SUPPLY REQUIRED

5¼" DISCS FROM AS LITTLE AS [illegible]PENCE

BLANK 5 1/4 DISCS
DISC NOTCHER FREE WITH EACH 100 DISCS PURCHASED

UNBRANDED	TRIAL 10	25	50	100	10 in a plastic lib. case
SS48 TPI	£4.50	£9.00	£17.00	£33.00	£5.50
DS48 TPI	£5.50	£11.00	£19.00	£35.00	£6.50
DS96 TPI	£6.50	£13.00	£21.00	£37.00	£7.50

BOX OF TEN BRANDED PRECISION DS/DD 48 TPI DISCS £6.99

ATARI HARDWARE – BARGAIN PRICES

520 STM, SF354 (½ meg drive)	£279.95
520 STM, SF314 (1 meg drive)	£335.95
520 STM, SF354 & SM125 mono monitor	£374.95
520 STM, SF[illegible]	£434.95
1040 STF [illegible]	£570.00
Mega ST [illegible]	£945.00
Mega ST [illegible] SM125	£935.95
Mega ST [illegible] megabyte	£1095.00
Mega ST [illegible] megabyte [illegible] SM125	£1180.00

All hardware comes with free [illegible] comes with 5 public domain discs including CPM emulator and the arcade game Mega-[illegible], 5 [illegible] additional discs from our public domain library. Basic language disc and manuals. 520 STM ONLY comes with 1st Word [illegible] and spelling checker.

LOCKING DISC BOXES

5¼" HOLDS 50	£7.95	5¼" HOLDS 100	£9.95
3½" HOLDS 40	£7.95	60/90 (HOLDS 60 3" or 90 3½")	£9.95

ANCILLARIES

ST/IBM/AMIGA/PC 1512 TO CENTRONICS PRINTER LEAD	£7.95
ST TO RS232 MODEM LEAD	£7.95
SWITCH BOX – 2 POSITION (ie 1 printer to 2 computers and vice-versa) Centronics or RS232 – please specify	£29.95

COMPUTER ACCESSORIES

5¼" DISC NOTCHER (Double your disc capacity on a single sided drive)	£3.95
DISC CLEANING KITS: liquid non-abrasive type – protect your valuable software	
5¼" DCK £3.95 — 3½" DCK	£4.95
SPECIAL PRICE	
[illegible] SMM804 Printer, SC1224 Colour Monitor, 1st Word & Spell it plus as above	** £999.00 **
MEGA ST (2 meg), SMM804, SC1224, 1st Word & Spell it	** £1250.00 **
MEGA ST (4 meg), SM125 Mono Monitor, SLM804 Laser Printer & SH205 Hard Disc Drive	** £2899.00 **

'Wild Prices'

(548)

"You've heard of Silicon Valley?
Now you have . . ."

Micro Mountain!!



Mountains of products at new low, low prices!!

JANUARY SALE EDITION

UNBRANDED DISC PRICES INCLUDE: SLEEVES, LABELS AND WRITE-PROTECT TAGS. ALL CARRY A CERTIFIED 100% LIFETIME GUARANTEE

NO HIDDEN EXTRAS . . .
WHAT YOU SEE IS WHAT YOU PAY!

ALL PRICES INCLUDE VAT AND CARRIAGE
ALL PRODUCTS CARRY A NO-QUIBBLE REPLACEMENT GUARANTEE FOR LIFE!!

WE SUPPLY

HOME USERS
USER GROUPS
TRADE
EDUCATION
GOVERNMENT
OVERSEAS
1-MAN BAND
TO
P.L.C's!!
WITH . . .

DISCS – 3", 3½", 5¼" & 8"
TAPES – REELS & CARTRIDGES
STORAGE – BOXES, LIBRARY CASES
PACKAGING – SCREEN PRINTING, LABELS
CUSTOMISATION – FORMS, LABELS ETC
SOFTWARE – IBM ETC
CABLES – CONNECTORS
ACCESSORIES – CLEANING KITS ETC
PAPER, RIBBONS ETC, ETC, ETC . . .

UNBRANDED DISCS

5¼" BULK

	25	50	100	250
Single Side 48T	£8.95	£16.95	£32.95	£74.95
Double Side 48T	£10.95	£18.95	£34.95	£81.95
Single Side 96T	£10.95	£18.95	£34.95	£81.95
Double Side 96T	£12.95	£20.95	£38.95	£89.95

3½" BULK

	25	50	100	250
Single Side 135T	£23.95	£46.95	£91.95	P.O.A
Double Side 135T	£26.95	£52.95	£98.95	P.O.A

★ ★ ★ SPECIAL DEALS ★ ★ ★

25 × 5¼" DS/48T PLUS DP100 DISC BOX ONLY £16.99!
25 × 5¼" DS/96T PLUS DP100 DISC BOX ONLY £19.99!
50 × 5¼" DS/48T PLUS DP100 DISC BOX ONLY £25.99!
50 × 5¼" DS/96T PLUS DP100 DISC BOX ONLY £27.49!
25 × 3½" SS/135T PLUS DP080 DISC BOX ONLY £31.99!
25 × 3½" DS/135T PLUS DP080 DISC BOX ONLY £34.99!
50 × 3½" SS/135T PLUS DP080 DISC BOX ONLY £54.99!
50 × 3½" DS/135T PLUS DP080 DISC BOX ONLY £59.99!

BRANDED DISKETTES

WE CAN SUPPLY ALL MAJOR BRANDS AT LOWER THAN TRADE!!
Example:

5¼" **VERBATIM** DS/DD 48T only £10.99 for 10
5¼" **3M's** DS/DD 48T only £5.99 for 10
5¼" **MAXELL** DS/DD 48T only £10.99 for 10
5¼" **DYSAN** DS/DD 96T only £13.99 for 10
5¼" **DYSAN** DS/HD 1·6Mb only £16.99 for 10
5¼" **XIDEX** DS/DD 48T only £3.95 for 10
3½" **SONY** SS/DD 135T only £14.99 for 10
3½" **SONY** DS/DD 135T only £17.99 for 10
3½" **SONY** DS/HD 2·0Mb only £39.99 for 10

DISC BOXES



DP050 DP080

Lockable with hinge, index dividers and two keys.

DP050 – Holds 70 × 5¼" **£6.90**
DP100 – Holds 100 × 5¼" **£9.90**
DP020 – Holds 20 × 3" or Holds 100 × 3½" **£9.90**
DP040 – Holds 40 × 3½" **£6.90**
DP080 – Holds 80 × 3½" **£9.90**

SPECIAL ★ LIMITED ★ OFFER

Solid Built Monitor or T.V. Swivel Stand

Special purchase enables us to offer you this **HIGH QUALITY ACCESSORY** at the remarkably **LOW PRICE OF**

ONLY **£4.99**

Limited Stocks

So Buy Now!

TO ORDER

Call our Order Desk on
0525 853333
quoting your
ACCESS or
BARCLAYCARD
Number or send a cheque or Postal Order with your requirements to:

DATApro Computer Supplies
DATApro House
North Street
Leighton Buzzard
Beds LU7 7EQ
0525 853333
(10 lines)

Fax: 0525 850485
Tlx: 826717 SHARET G-165

TRADE ENQUIRIES WELCOME!

SAME DAY DESPATCH

24 HOUR ORDERLINE – 0525 853333

FRONT DESK

PC accounts from Multisoft

● *Microsystems*, with its document-driven screens, is aimed at first-time users.



Multisoft Systems, a company better-known for its Unix software, has moved into the PC market with an accounting package aimed at small businesses. It reckons there are 700,000 businesses in the U.K. which have not yet computerised their records, many of them with an annual turnover of between £50,000 and £500,000.

Instead of offering a scaled-down version of its larger products, Multisoft has opted to design for this market a new program, *Microsystems*.

With the aim of being the easiest product to use among its competitors, several innovations have been introduced, such as 200K of help screens and an enquiry facility which allows the user to consult other files without exiting the file on-screen. Of particular advantage to the first-time user is that Microsystems is document-driven. Cheques look like cheques and paying-in slips look like paying-in slips. All parts of the accounts system are updated automatically, including late amendments to transactions which have already been completed.

Included with the package is a half-hour video narrated by Chris Serle. It uses the imaginative analogy of the computer as an office and seems for once to be genuinely illuminating for the novice.

The potential disadvantage to Microsystems is price. At £395 it is not the cheapest software to be found, especially if stock control and payroll modules at £95 and £145 respectively are to be added. Hardware requirements are another potentially awkward problem as the package runs only on PCs with a hard disc. Those comments are not so much criticisms of Microsystems as a reminder that it is a high-class product. Ultimately it may be worth the extra outlay for an expansive and superior accounts system.

Kuma lays on fancy spread

Kuma has launched an intuition-based spreadsheet for the Amiga. *K-Spread 2* is claimed to be exceptionally easy to use and features a range of spreadsheet and business graphics to allow beginners and experienced computer users to gain maximum benefit from the program with the barest effort.

Jon Day, marketing director of Kuma, said: "K-Spread 2 gives professional results with the minimum investment of training time; it is ideal for any businessman or serious user with or without computer experience."

A wide range of features include trigonometic functions, conditional tests such as <,> and more. Macros are also included, together with date, time, month, hide, trace and others.

There is also a facility to produce graphs from the spreadsheet data and printer configuration is included to send control codes within the spreadsheet if required.

K-Spread 2 costs £79.95. For more details telephone 07357 4335 or write to Kuma Computers Ltd at 12 Horseshoe Park, Pangbourne RG8 7JW.

First coloured Star

The LC-10 printer from Star Micronics, praised in the March issue of *Your Computer*, is now available in a colour version. Previewed at the Which Computer? Show, it can print in up to seven colours but uses a standard black ribbon. Expect to pay around £300, inclusive of VAT.

Also seen at the Birmingham exhibition was a dedicated model of the LC-10 for the Commodores 64 and 128. It retails at £229 plus VAT, the same price as the standard version.

● The colour model of the Star LC-10 uses a standard black ribbon.



Pieces of eight

Logotron has released a package called *Eight in One*, following its price-breaking 1295 series last autumn. That featured a word processor, a database and a spreadsheet at £12.95 each, or £30 for *Three in One* which contained all three programs.

Eight in One contains the original programs and an additional five, comprising graphics, a comms utility, a spelling corrector, a desk-top organiser with diary, reminders and address book, and an outliner which is designed for jotting ideas before entering the full word-processing facility.

Unlike its predecessor, Eight in One will be available only on IBM PC-compatibles. It is compatible also with major software such as *dBase III* and *Lotus 1-2-3*. The package will cost £49.95.

Product:	Supplier:	Price:
Cubpack PC1 and PC2	Microvitec	£649 for PC1, £799 for PC2 and bundled software.

TALENTS

SUSAN NOYES REVIEWS A LOW-COST PC WHICH WILL ALSO RUN BBC SOFTWARE.

Microvitec, the Bradford-based company, has released two new PC-compatible machines. The Cubpack PC1 has a single floppy drive and costs £649 while the CubPack PC2 has two floppy drives and includes the Ashton-Tate *First Framework* software in its price of £799.

There is nothing very startling, you might think, in the news that another company has released another PC-compatible. The bare bones of this story, however, conceal some interesting developments which are worth considering. For that reason *Your Computer* decided to investigate further.

Microvitec is one of the most important companies in the educational market, best-known for its Cub monitors. According to figures researched by Romtec, 80 percent of the 14in. colour monitors sold in the educational market are manufactured by Microvitec and sold either under the company name or by other companies under OEM deals. Microvitec has built a reliable dealer network and has acquired a good reputation for the quality of its service and support.

That puts it in a good position to address some of the problems which now beset educational computing. A few years ago there was a certain self-satisfaction in the air as the Government congratulated itself on its achievement of having managed to install at least one computer in every school in the land. Since then it has become apparent that the achievement concealed a major problem – children became familiar with the BBC computer in schools but left to hunt for jobs in a world where the IBM PC standard held sway.

At first that did not seem a problem, since it was assumed that the important thing was for children to become computer literate; in recent months, though, it has become fashionable to deride the notion of computer literacy and to argue that if children are entering a world where the PC reigns supreme they should be grappling with the same PC in school.

One solution to the problem is represented by the Archimedes, the new BBC computer, which can provide the emulation to run PC software. The Archimedes is expensive and has been slow to establish itself. It was only a matter of time



- **The projected interactive video workstation with the Cubpack as its nucleus.**

> *"If children are entering a world where the PC reigns supreme, they should be grappling with the same PC in school."*

before another company adopted the opposite approach and produced a cheap PC which could run BBC software. That is what Microvitec has done.

The Cubpack PCs cannot run all software written for the BBC. To understand the limitation you must realise that there are two categories of program written for the BBC. The first category is written in the Assembler language of the 6502 chip. Such programs are compiled, which essentially means that they run faster and more efficiently than non-compiled programs; most games for the BBC are written in Assembler to take advantage of the extra speed. The alternative to compiling a program is to interpret it – each step of the program effectively is compiled line by line as the program is run. The second category of program is represented by BBC Basic routines.

The Microvitec strategy has been to produce a PC-compatible 8088 processor chip which includes a Basic interpreter which understands the syntax of BBC Basic. A program written in BBC Basic could be run on the Cubpack PC so that schools will not waste the time and energy they have invested in writing Basic programs. Unfortunately, however, programs written for the BBC in 6502 Assembler will not run on the Cubpack.

To facilitate the transfer of programs from the BBC to the Cubpack PC, Microvitec plans to release a file-transfer package which will allow you to transfer listings of Basic programs from the BBC to the PC; the package will prevent you needing to type-in at the PC program listings already keyed-in at the BBC. The package is not yet available, so *Your Computer* was unable to assess its effectiveness.

The Microvitec machines begin to look like a neat method of bridging the gap between the previously-incompatible worlds of the BBC and the PC. Given the massive investment of the educational world in BBC software, the Cubpack PCs should prove a winner. It is worth remembering, too, that there are many people who bought a BBC several years ago but who are now enviously looking at the volume and quality of software written for the PC and have not yet been tempted by the various Amstrad PCs. There is a market only too ready for a clever product like the Cubpack.

It is true that the Cubpack PC, viewed as a PC, does not reveal much innovation. The machine supplied was the twin floppy computer. The processor is the venerable 8088 chip which has 512K of RAM and runs at a stately 4.77MHz.

To give some basis for comparison, the Amstrad 1512, which is not exactly the Ben Johnson of the computing world, runs an 8088 chip at 8MHz. In other words, the Cubpack PC looks and feels

Address:
Microvitec plc, Futures Way,
Bolling Road, Bradford,
West Yorkshire BD4 7TU
Telephone:
0274 390011

TSCOUT

like old-fashioned technology. In its favour is the fact that it ran all the standard PC software without difficulty.

The computer and the monitor arrive in a sturdy metal casing. The Cub monitor supports CGA graphics, in other words a step-down from the EGA standard of the Amstrad 1640. The monitor performs as reliably as you would expect from a company which made its name with its monitors. There were some problems with what looked like intermittent interference on the screen which produced a snow effect; there was no apparent source for the interference. The monitor, of course, supports graphics.

Both the PC1 and PC2 have a U.K.-style keyboard with 84 keys. Both machines run version 3.2 of DOS which is included in the price. The £799 price of the twin-floppy PC2 also includes the First Framework package; the package is not bundled with PC1, presumably on the grounds that the software would not be very useful with only one drive.

The bundling of First Framework suggests a comparison with the Amstrad 1512 which is now bundled with the *Ability* package produced by Migent. First Framework and Ability belong to the same category of integrated software. The inclusion of First Framework boosts the value of the PC2 considerably and must be regarded as something of a coup by Microvitec. After all, Ashton-Tate is one of the biggest software producers in the world and is best-known for the *dBase* database. First Framework is a cut-down version of the complete Framework package and sells on its own for around £100.

First Framework is designed to look like a Macintosh program and uses windows and icons. Most programs in that style expect you to use a mouse but First Framework is driven by the keyboard, so will feel uncomfortable to anyone accustomed to the Mac or Atari. For beginners to computing, though, First Framework is pleasingly easy to use.

The program consists of the inevitable components – word processor, spreadsheet, database and graphics. The components are all competent rather than inspiring but that is true of most integrated packages, especially the cut-down versions aimed at Amstrad users. The word processor is satisfactory if you are working only with small documents but lacks some of the features you would expect from a dedicated word processor. You cannot cut and paste text, while the mail-merge facilities imposed a strain on the PC2. It is only fair to record, though, that many people will be content with First Framework and will find it satisfies



• **Software bundled with the Cubpack includes *First Framework*.**

"It ran all the standard PC software without difficulty."

their computing needs.

Looking to the future, Microvitec has hinted that the PC might form the heart of a workstation designed for interactive video. An interactive video unit would consist of four elements – a monitor and touch screen combined in one unit, PC and laser disc player.

The laser disc player plays 12in. video discs which are therefore different from the smaller CD-ROMs and optical discs. A video disc can store up to 54,000 still frames of video information which is equivalent of the capacity of 36 minutes of video tape; those frames can be projected with accompanying text on to the monitor under control of the PC. To do that the PC requires an overlay card which locks together text and images in a procedure known as Genlock.

The advantage of video discs, compared to ordinary video tape, is that the images can be accessed very rapidly. An image stored anywhere on the video disc can be recalled within two seconds; the corresponding access time for video tape is between 30 and 60 seconds. A video disc is prepared from an ordinary video tape; Microvitec has already invested considerable money in the equipment which provides the facility to cut video discs.

Once the video disc has been mastered the interactive element is introduced into the system via an expert authoring language which allows you to program the images. Each image on the video disc is identified by a frame number, which is used as a reference by the program. As an example, the text on the screen might ask a question related to a particular image. The question would be answered via the touch screen; the next image to appear on the screen would depend on the answer. The selection of succeeding images is controlled by the pre-programmed expert language.

Examples of current expert authoring languages are Turpin, Topclass and Mentor. The program can be stored in an EPROM, an approach followed by the BBC Domesday project which is the best-known application of 12in. laser discs so far.

The technology is interesting but its potential uses are fascinating. It seems that Microvitec has not only produced a machine which connects the worlds of education and industry but has also discovered an application, interactive video, which should provide another link between the two previously-incompatible worlds.

At the time of writing the development of an interactive video workstation has some way to go. It is clear, though, that the release of the Cubpack is something more than a story of yet another company releasing yet another PC.

HARDSOFT · INTERNATIONAL

1A The Square, Sawbridgeworth, Herts.
0279 726488/726406

Office automation at a price that is affordable. Lease an Amstrad PC1640 DD-MD + Epson printer + wordprocessor + spreadsheet for under £7.00 per week.

As an approved dealer for Amstrad, Epson, Seikosha, Star, Olivetti etc., we offer free unbiased advice on various machines and software. Our sales team can demonstrate any machine anywhere in Britain and will advise you on which of our eight different leases will suit your needs best.

CONTACT US TODAY FOR A FREE QUOTATION

NATIONWIDE NEXT DAY DELIVERY ★ CONSUMABLES ★ FREE TAX & FINANCIAL GUIDANCE ★ CONTINUOUS STATIONERY ★ 24 hr MAINTENANCE CONTRACTS ★

PCW 9512 in stock £499 + VAT (including FREE maintenance)
SPECIAL OFFER – ATARI STFM £274.00
AMIGA A500 £439.00 inc. VAT & P.P. modulator + software

(460)

LOUTRONICS

Oliveti Half Height 80 Track D/S Disk Drive Fully Tested	£57.95 p&p £2
NEC 3½" 80T D/S, will fit ST (brand new)	£75 p&p £2
5¼" Half height drive 40T D/S Fully tested	£38 p&p £2
Joystick Mechanism (not cased) Rotary Switched, Brand new	£1 p&p each, or £5 for 6, p&p 75p
Hard Controller Cards (IBM compatible) Omtpl or Western Digital half length	£86 inc VAT £2
NEC 3½" 80T D/S in 5¼" frame (brand new)	£79.95 p&p £2
Mitsubishi Colour Monitor 14" IBM/Clone	£150 inc. carriage by arrangement.
Astec Switch mode PSU card, 5V at 2.5 A, 12V at 2A and – 12V at 100mA brand new.	£16.95 p&p £2
Rodime 10 Mb full height Winchester (brand new)	£99.95 p&p £5
IBM/Clone mono/printer Hercules card	£19.95
IBM/Clone colour/ printer card	£29.95
5¼ Single drive case no. P.S.U.	£8.95 p&p £2

PLEASE NOTE: WINCHESTERS DO NOT INCLUDE CONTROLLERS OR CABLES, AND DISK DRIVES DO NOT INCLUDE CASES OR POWER SUPPLIES. WE ARE CHEAP BUT NOT MENTAL.

Many surplus computer bargains components, connectors, RAM, Eproms. etc.

11 Hercies Road, Hillingdon, Middlesex UB10 9LS
Tel: 0895 55399 (Wednesday closed).

All prices include VAT

ASHCOM

ATARI HARDWARE

520STFM Keyboard/Mouse/.5meg drive	259.95
1040STF Keyboard/Mouse/1 meg drive	435.00
1040STF Keyboard/Mouse/1 meg drive/mono monitor	519.95
1040STF Keyboard/Mouse/1 meg drive/colour monitor	669.95
Mega ST 2 meg Ram/Mouse/mono monitor	854.945

Phone or write for prices of peripherals

COMMODORE HARDWARE

Amiga A500, Deluxe Paint	435.95
Amiga A500 modulator	455.00
Philips 8833 colour monitor (with ST or Amiga leads)	270.00
Cumana disk drive	135.00
3.5" discs DS/DD guaranteed (packed in 10s)	12
25 Bulk packed 3.5 inch disc DS/DD guaranteed	£25
3.5" DS/DD discs (certified, gurananteed with lables)	
10 in library case	12.00
25	25.00
50	47.00
100	90.00
500	425.00
1000	825.00

Trade enquiries welcome for larger quantities

ATARI SOFTWARE

Phone for details of special software pack

	RRP	Our Price
Fast Basic	89.90	69.50
Gauntlet	24.95	18.50
Barbarian	24.95	18.50
First Word Plus	79.95	62.95
GST C Compiler	59.95	19.95
Wordwriter ST	79.95	62.95
Data Manager ST	79.95	62.95
Swift Calc ST	79.95	62.95

AMIGA SOFTWARE

	RRP	Our Price
Faery Tale Adventure	49.95	38.50
Balance of Power	29.95	22.50
Fire Power (New)	24.95	18.50
Space Battle	9.95	8.50

New software and hardware is constantly being added to our list at massive discounts so if you do not see what you want call us for latest products and prices.

All prices include VAT @ 15% and p.&p. on UK Mainland

Send SAE for full price list

All items are despatched within 24 hours, subject to availability

To order send cheques/PO or Visa/Access details to the address below or call us on (0530) 411485 with your credit card details

ASHCOM, 10 The Green, Ashby de la Zouch, Leicestershire LE6 5JU (652)

Until end of March only
£259.00

AMAZING OFFER ON ATARI STFM

3½" 85p

Price include VAT Post (UK)
NO QUIBBLE LIFETIME GUARANTEED

25% OFF ALL ATARI ST SOFTWARE

Hundreds of titles stocked at ridiculously low prices.
Cash/Cheque/Postal orders payable to 'Chevron Electronics Ltd.

CHEVRON ELECTRONICS LTD, PO BOX 24, HORNCHURCH, ESSEX

CLIK
AMIGA SOFTWARE SPECIALIST

Unit 1, Willowsea Farm, Spout Lane North, Stanwell Moor, Staines, Middx TW19 6BW

*All titles marked * will be shipped on release data.*

GAMES	RRP	OUR PRICE
ALTERNATE REALITY*	24.95	18.50
AMERICAN POL SIM*		
AUTO JEWEL	24.99	18.50
ALIEN STRIKE	19.95	15.00
ADVENTURE CONS SET	29.95	21.50
ART PARTS I	9.95	7.50
ART PARTS II	9.95	7.50
ARCTIC FOX	29.95	21.50
ARENA/BRATTACUS	34.95	24.75
ARCHON	29.95	21.50
ARCHON II	29.95	21.50
B.M.X. SIMULATOR*		
BATTLE THRU TIME	9.95	7.50
B.M.X.	9.95	7.50
BALL RAIDER	19.95	15.50
BACKLASH	19.95	15.50
BALLYHOO	29.99	21.50
BALANCE OF POWER	39.95	26.50
BARABARIANS	24.95	18.50
BUREAUCRACY	34.99	24.75
BORROWED TIME	24.99	18.50
BASEBALL	24.99	18.50
BARDS TALE	24.95	18.50
CHESSMASTER 2000	24.95	18.50
CHAMPION GOLF	34.99	24.75
CHALLENGER	9.95	7.50
CUT THROATS	29.99	21.50
CRUNCHER FACTORY	9.95	7.50
7 CITIES OF GOLD	29.95	21.50
CALIFORNIA GAMES*	24.99	18.50
DR FRUIT*	9.95	7.50
DEMOLITION	9.95	7.50
DEJA VU	29.95	21.50
DIABLO	19.95	15.50
DEFENDER OF THE CROWN	29.95	21.50
DEEP SPACE	29.95	21.50
DEADLINE	29.99	21.50
EXTENSOR	19.95	15.50
ENCHANGER	29.99	21.50
EARL WEAVER BASEBALL	24.95	18.50
FEUD	9.99	7.50
FLIGHT SIMULATOR	49.95	34.50
FINAL TRIP*	9.95	7.50
FOOTBALL GFL	24.99	18.50
FLIGHT SIMULATOR 2	49.95	32.50
FIGHTER COMMAND	29.99	21.50
FAERY TALE ADV	49.99	32.50
GRAND PRIX SIMULATOR*		
GRID START	14.95	11.50
GUNSHIP II	24.95	18.50

	RRP	OUR PRICE
GUILD OF THIEVES	24.99	18.50
GOLDRUNNER	24.95	18.50
GAUNTLET*	24.99	18.50
HOLLYWOOD POKER	19.95	15.50
HOLLYWOOD HIJINX	29.99	21.50
HITCH HIKER	29.99	21.50
HARDBALL*		
HACKER	24.99	18.50
HACKER II	24.99	18.50
INSANITY FIGHT	24.95	18.50
IMPACT	14.95	9.75
INSTANT MUSIC	29.95	21.50
INFIDEL	29.99	21.50
JINXTER	24.95	18.50
JUMP JET	9.95	7.50
JEWEL OF DARKNESS	19.95	15.50
KINGS QUEST PACK*	24.99	18.50
KARTING GRAND PRIX	9.95	7.50
KNIGHT ORC	24.95	18.50
KARATE	19.95	15.50
KINGS QUEST III	29.99	21.50
KAMPFGRUPPE	29.99	21.50
KARATE KID II	24.95	18.50
LEISURE SUIT LARRY*	24.99	18.50
LEADERBOARD	24.95	18.50
LEATHER GODDESS	29.99	21.50
L.C.P.	34.99	24.75
MUSIC STUDIOS	34.99	24.75
MOON MIST	29.95	21.50
MINDSHADOW	24.99	18.50
MIND FOREVER	34.99	24.75
MOUSE TRAP	14.95	11.50
MEAN 18	29.99	21.50
MECH BRIGADE	21.50	18.50
MARBLE MADNESS	29.95	21.50
NINJA MISSION	9.99	7.50
ONE ON ONE	29.95	21.50
OGRE	24.99	18.50
PUB CRAWL*	9.99	7.50
PORTAL	34.99	24.75
PLUTOS	14.95	11.50
PLANETFALL	29.99	21.50
PHANTASIE	24.99	18.50
PAWN	24.95	18.50
RED ARGUS	21.69	15.25
ROADWARS*	19.95	15.50
ROADWAR 2000	24.99	18.50
SPACE RANGER*	9.99	7.50
SOLID GOLD*	9.99	7.50
STREET SPORTS BASEBALL*	24.95	18.50

	RRP	OUR PRICE
SKY FIGHTER*	14.95	11.50
SUSPENDED	29.99	21.50
SUPER HUEY	19.99	15.50
SUSPECT	29.99	21.50
SORCERER	29.99	21.50
STATIONFALL	29.99	21.50
STARCROSS	29.99	21.50
STAR GLIDER	24.95	18.50
SILENT SERVICE	24.95	18.50
SILICON DREAMS	19.95	15.50
SKY FOX	14.95	11.50
SKY FIGHTER	14.95	11.50
SINBAD & THRONE OF FALCON	29.95	21.50
SINBAD	39.95	24.75
SHANGHAI	24.99	18.50
SEASONS & HOLIDAYS	9.95	7.50
SEASTAKLER	29.99	21.50
S.D.I.	29.95	21.50
SURGEON	49.95	32.50
SWOOPER	19.95	15.50
STRETEGIC DEF INITIATIVE	29.95	21.50
STRIP POKER	19.95	15.50
SPACE QUEST	29.99	21.50
SPACE BATTLE	9.95	7.50
SPELLBREAKER	29.99	21.50
TIME & MAGIK	19.95	15.50
THAI BOXING	9.95	7.50
TRINITY	34.99	24.75
TERRORPODS	24.95	18.50
TEMPLE OF APSHAI	24.99	18.50
TASS TIMES	24.99	21.50
UNINVITED	29.95	21.50
ULTIMA 4	24.99	18.50
ULTIMA 3	24.99	18.50
UNIVERSAL MILITARY SIM	24.95	18.50
VADAR*	9.95	7.50
WINTER OLYMPIAD 88*	19.95	15.50
WIZARDS CROWN	29.99	21.50
WISHBRINGER	29.99	21.50
WORLD GAMES	24.99	18.50
WITNESS	29.99	21.50
WINTER GAMES	24.99	18.50
ZORK I	29.99	21.50
ZORK II	29.99	21.50
ZORK III	29.99	21.50
UTILITIES		
ANALYZE	149.95	92.50
BBS PC	99.95	65.00

	RRP	OUR PRICE
DELUX PRINT	24.95	18.50
DELUX PRINT II	69.95	48.50
DELUXE MUSIC CON SET	69.95	48.50
INSTANT MUSIC	24.95	18.50
LISP	149.95	95.50
LATTICE C PROFF	299.00	184.50
LATTICE C	129.95	81.50
MUSIC STUDIO	34.99	24.75
MI-AMIGA FILE	99.95	65.00
ORGANIZE	99.95	65.00
PUBLISHER 1000	199.95	120.00
PASCAL	89.95	59.50
SCRIBBLE	99.95	65.00
T.V. TEXT	99.95	65.00
VIP PROFF	228.25	165.00
WORD PERFECT (Version 4)	293.25	215.00
ZUMA FONTS 1	34.95	24.75
ZUMA FONTS 2	34.95	24.75
ZUMA FONTS 3	34.95	24.75

All our prices include VAT and First Class Post. Telephone

(0753) 682988

For personal service please make cheques payable to Clik and send to:

CLIK, UNIT 1, WILLOWSEA FARM, SPOUT LANE NORTH, STANWELL MOOR, STAINES, MIDDX. TW19 6BW.



(All 1512 come with 4 US Games + Migent ability)
RPM 'Phone 01-585 0891

Opening hours Mon–Fri 9 am–8 pm
Sat–Sun 10 am–5 pm

AMSTRAD PC SINGLE DISC DRIVE

1512 PC Mono Computer	(£380.00 Ex. VAT)	£437 Inc. VAT
1512 PC Colour Computer	(£520.00 Ex. VAT)	£598 Inc. VAT
1640 PC Mono Computer	(£474.78 Ex. VAT)	£546 Inc. VAT
1640 PC CGA Colour Monitor	(£605.22 Ex. VAT)	£696 Inc. VAT
1640 PC EGA Colour Monitor High Res.	(£735.65 Ex. VAT)	£846 Inc. VAT

AMSTRAD PC TWIN DISC DRIVE

1512 PC Mono Computer	(£476.00 Ex. VAT)	£548 Inc. VAT
1512 PC Colour Computer	(£614.00 Ex. VAT)	£706 Inc. VAT
1640 PC Mono Computer	(£561.74 Ex. VAT)	£646 Inc. VAT
1640 PC CGA Colour Monitor	(£692.17 Ex. VAT)	£796 Inc. VAT
1640 PC EGA Colour Monitor High Res.	(£822.62 Ex. VAT)	£946 Inc. VAT

AMSTRAD PC WITH SINGLE DRIVE + AMSTRAD 20M HARD DISC

1640 PC Mono Computer	(£848.70 Ex. VAT)	£976 Inc. VAT
1640 PC CGA Colour Monitor	(£892.17 Ex. VAT)	£1026 Inc. VAT
1640 PC EGA Colour Monitor High Res.	(£1109.57 Ex. VAT)	£1276 Inc. VAT

AMSTRAD PC WITH SINGLE DRIVE + (R.P.M.) 20M HARD DISC

1512 PC Mono Computer	(£595.65 Ex. VAT)	£685 Inc. VAT
1512 PC Colour Computer	(£734.78 Ex. VAT)	£845 Inc. VAT
1640 PC Mono Computer	(£791.30 Ex. VAT)	£795 Inc. VAT
1640 PC CGA Colour Monitor	(£821.74 Ex. VAT)	£945 Inc. VAT
1640 PC EGA Colour Monitor High Res.	(£952.17 Ex. VAT)	£1095 Inc. VAT

★ R.P.M. 'PHONE 01-585 0891 – 20M HARD DISCS FOR AMSTRAD COMPATIBLES – FROM £250 Inc. VAT ★

AMSTRAD SYSTEMS

E.g. Amstrad PC computers + 20Mb hard disc. Wordstar + MP20 Daisywheel printer. All set up, just switch on and type. Computer aided design and desktop publishing systems also available, tailored to your requirements. Prices starting from **£689** + VAT

Amstrad 1640 20mb hard disc. MP40 Daisywheel printer and leads, Wordstar, Switch on and type! .... £1656 inc. VAT

Supercalc + ... £30 ex. VAT

★★★★★★★★ SPECIAL AMSTRAD DEALS ★★★★★★★★

★ COLOUR AMSTRAD 1512 SD WITH AMSTRAD MODEM CARD ★

(Including free Telecom Gold registration, Telex Prestel bulletin boards V21/V23 + US Gold package + Migent Ability)

PRICE (£607.82 Ex. VAT) £699.00 Inc. VAT

PHONE 01-585 0891

★ AMSTRAD PRINTERS + SOFTWARE ★

★ DMP 4000 (200 cps, takes 16.5 inch paper) + Supercalcs 3 .... (£299 Ex. VAT) £343.85 Inc. VAT ★

★ LQ 3500 Near Letter Quality Printer (24-pin dot matrix 160 cps) + Wordstar (£299 Ex. VAT) £343.85 Inc. VAT ★

★ MICRO P RANGE OF PRINTERS ★

MP 26 Daisywheel, paper width 343mm, 165 col., 2K buffer, op. 6K buffer, 26 cps £225.21 Ex. VAT
MP 40 Daisywheel, paper width 419mm, 165 col., 8K buffer, 40 cps .... £313.00 Ex. VAT
MP 135 Dot matrix, paper width 254mm, 2K buffer, op. 8K buffer, 135 cps .... £146.00 Ex. VAT
MP 165 Dot matrix, paper width 254mm, 2K buffer, op. 8K buffer, 165 cps .... £199.00 Ex. VAT
MP 200 Dot matrix, paper width 254mm, 7K buffer, op. 8K buffer, 200 cps .... £286.00 Ex. VAT
MP 480 Dot matrix, paper width 254mm, 8K buffer, op. 32K buffer, 480 cps .... £320.00 Ex. VAT
MP 700 Dot matrix, paper width 406mm, 8K buffer, op. 32K buffer, 700 cps, which = 252 lines per minute. £535.00 Ex. VAT Yes 700 cps
NEC P2200 24 pin dot matrix .... £385.00 Ex. VAT

AMSTRAD PCW

PCW 8256 and PCW 8512 – prices starting from £185 Ex. VAT
PCW 9512 – £485 Ex. VAT

EPSON PC COMPATIBLES

Epson PCE single floppy disc computer .... £524 Ex. VAT
PCE Hard disc .... £776 Ex. VAT

FOR GREAT DEALS ON AMIGA AND ATARI SOFTWARE

PHONE 01-585 0891

GAMES – ALL AT £18 Inc. VAT each

Starlight, Infiltrator, Mean 18 (Golf), Sub Battle, F-15 Strike Eagle, Chuck Yeager's (Advanced Flight Trainer), Brian Clough's Football Fortune, Summer Games II, Winter Games II. Many games and other software in stock please 'phone 01-585 0891.

(694)

5GL THE FIF[T]... AMEN[D]...

For anyone who wants to stay one jump ahead in the field of computer languages it can seem almost obvious that fifth generation languages are those with which you should be familiar. Fifth generation languages are those which are said to go hand-in-hand with the latest fifth generation hardware. Fifth generation languages are clearly at least one step better than fourth generation languages and, probably, almost twice as good as third generation languages. The only question which seems to remain is what are they?

The answer, in part, is fairly clear, especially if we start at the beginning with first generation languages. In the beginning there were computers but computers, having only recently been invented at that time, there were very few computer languages with which to program them. That was not too serious a problem because it was always possible to program the machines directly using the very lowest-level language of all, machine code.

Machine code is the language the hardware of a computer, primarily its central processing unit, understands directly and you can program your computer in it today if you wish to do so. In modern parlance this is often known as coding directly on to the metal and you would do it on a modern micro by writing your code as slabs of hexadecimal numbers. All possible and, as far as the machine is concerned, very efficient but, from your point of view, rather time-consuming and error-prone.

That was always the case, so along came the second generation of languages.

Second generation languages are not really too clever – or too impressive – but they were, and still are, enormously useful. The best example of a second generation language – in fact the only example – is Assembler, where Assembler refers both to the language and also to the program which

TH
DMENT

CHRIS NAYLOR POINTS TO THE FUTURE DIRECTION OF PROGRAMMING, FIFTH GENERATION LANGUAGES.

translates programs written in that language automatically into machine code.

With an Assembler language you write code which is easier for you to understand, largely because of its mnemonics and its rather more coherent structure when compared to machine code. When you have written that Assembler code the Assembler program translates what you have written into machine code which can then be executed on the machine. That approach may not be exciting but it produces code which is only very slightly removed from that which would have been produced had you been coding directly in machine code. That makes the resultant assembled code very efficient in its use of processor time and memory space.

It still was not very easy to program in Assembler; for many people something easier still was called for and that led to third generation languages.

They were the so-called high-level languages, so-called because they enabled programmers to state what they wanted doing in a fairly high-level fashion, well removed from the machine operations. Instead of having to be aware of what was happening at the level of memory locations and CPU registers, the programmer could fairly readily write a comprehensible program which was aimed at solving some specific program. In the 1960s third generation languages

Figure 1. The program Socrates.Pro
mortal(X):-man(X).
man(socrates).

Notes:
This simple illustration of a Prolog program asserts that X is mortal if X is a man; and that socrates is a man. Notice that any item which starts with a capital letter in Prolog is a variable, whereas any item which starts with a small letter is a constant. That is why "Socrates" has a small 's' here because it is a constant rather than a variable name.

If at the Prolog prompt? – we now ask the prolog question ?-mortal (socrates). Then we get the reply from Prolog: yes. If we ask the question: ?-mortal(X). Meaning: Is there an X such that it is mortal? We get the reply: X=socrates. Meaning that there is an X such that X is mortal and that X is socrates.

flourished with some of the best-known high-level languages being defined and implemented then, including Cobol, Basic, Fortran and Algol. Those languages are still very important third generation languages. They are still very useful and very widely-used.

It is at that point that the problems

Figure 2. The program SUM.PRO
sum(X,Y,Result):-Result is X+Y.

Notes:
This is more complex. It says that sum(X,Y,Result) is true if Result is X+Y. Which makes sense assuming that we want the variable Result to hold the sum of X+Y. Consequently, if we ask Prolog: ?-sum(2,3,Result). In other words "Is there a value for Result such that 2 and 3 would, when added, be the same as it" Prolog gives the reply: Result=5

seem to begin and they arise on two main fronts. First, on the hardware front, there had also been three generations of hardware up to that point. The first generation had relied on valves; the second on transistors; the third on integrated circuits, the first chips.

Then the explosion in chip technology occurred and a fourth generation of hard-

5GL

THE FIFTH

C O N T I

Figure3. The program FACTOR.PRO

```
factor(1,1):-!. factor
factor(N,Result):-N1 is N-1,factor
(N1,Result1),Result is Result1*N.
```

This program can be run as follows:

```
?-factor(6,X). X=720
```

Notes:

Maths gets even worse with this one. The factorial of a number N (written as N!) is defined as:
N!=(N-1)*(N-2*. . .*3*2*1.
So: 6!=6*5*4*3*2*1=720
You can write a simple loop to evaluate factorials using Basic or most other third generation languages. Here, though, we make the following declarations to Prolog: 1 is the factorial of 1. Result is the factorial of N if N-1 is N1 and Result1 is the factorial of N1 and Result is Result1 times N. Believe it or not, that evaluates any factorial although you might be some time working out why.

Figure 4. The Program INOUT.PRO

```
run:-input(X),nl,output(X). /* Input section */
input(X);-write('Input a sentence:-
'),nl,read_sentence(X).
read_rest(List,A),name(X,List).
read_rest([],10):-!.
read_restB],A)get0
(Next_,rd rest(B,Next_A).
/* Output section */
output(X);-write('The sentence you input
was :-'),nl,name(X,List),write_sentence(List).
write_sentence([]).
write_sentence([AIB]):-put(A),
write_sentence(B).
```

This program can be run as follows:

```
?-run.
Input a sentence :- How about this.
The sentence you input was:- How about this.
Yes.
```

Notes:

Like maths, even simple input/output operations can be troublesome in Prolog. This is because it is difficult to tell Prolog explicitly what to do as we would with a procedural language.

Exactly how difficult it is often depends on the exact implementation of Prolog which you use. All the examples are written in Prolog-2 from the Oxford-based firm of Expert Systems International Ltd. This is a very pure form of Prolog which conforms with Edinburgh syntax and is much-favoured by workers in artificial intelligence.

An easier version to understand is Turbo Prolog from Borland International. This is more like a hybrid between the academically-favoured Edinburgh syntax and an ordinary procedural language. It tends to attract adverse criticism from workers in AI but is certainly easier to learn if you are already used to procedural languages.

Both versions of Prolog are available for the IBM PC and close compatibles.

ware emerged using large scale integrated circuit technology, which was followed by more esoteric machines using very large scale integrated circuit technology. That produced fourth generation hardware and, eventually, fifth generation hardware – or at least the promise of it.

Each new generation of hardware technology had, by chance, occurred at roughly the same time as a new generation of programming languages. So if this was fourth generation hardware, where were the fourth generation languages? If fifth generation hardware was being seen on the horizon, where were the fifth generation languages?

The other side of the problem occurred on the software side as people noticed that programming languages had, through the years, become easier and easier to use. They had become much less machine-orientated and much more problem-orientated. Surely this process would not stop at the third generation of languages? Surely, someone, somewhere, would develop something further than that and produce a fourth generation language, followed, presumably, by a fifth generation language?

That was how it happened that, eventually, people started producing fourth generation languages and, eventually, fifth generation languages. Or, at any rate, they called one set of new products the fourth generation and another set the fifth.

Specifically, fourth generation languages are usually program generators. They are software tools which permit programs to be written more or less automatically. In the early days the programs which were produced automatically in this way tended to be in a third generation language such as Basic but later the program generators often produced code which would run only in their own special environments.

Those program generators were, and still are, useful. Most modern database management packages have something of the kind included with them nowadays. Although useful, they have scarcely set the world on fire if only because the need to be able to generate code automatically inevitably imposes constraints on the range of things that code can do. That is why almost all 4GLs are available only in the rather restricted world of business applications, in which the range of user requirements is usually fairly limited.

That now brings us to fifth generation languages which emerged because there was a fifth generation of hardware being developed which, presumably, would have a fifth generation language to run on it; and, because there had, apparently, already been developed a set of fourth generation languages.

For all practical purposes the term fifth generation language refers solely to the artificial intelligence language Prolog and some of its close derivatives. That is because when the Japanese sparked a world-wide flurry of AI research with their announcement that they were working on fifth generation hardware, they also announced that Prolog was to be the main language they would use on those machines. Therefore Prolog was surely the 5GL for which everyone had been waiting.

From the point of view of a computer Prolog is much more like a third generation language. That is because third generation languages traditionally have their source code translated into an assembler language which is then translated into machine code – making the third generation language also the third layer in a software cake which resides directly on top of the hardware. Prolog, too, occupies roughly the same position in relation to the hardware of the machine.

This is unlike a 4GL which might produce an intermediate code which was itself in a third generation language and which would have to pass down through the usual software layers to reach the hardware, so that a 4GL might have been the fourth layer of software above the machine.

So it makes sense to say that Prolog is just another programming language and that all talk of 5GLs is pure hype of a kind which owes its origins to the hype which suggested that program generators were 4GLs. In other words, you could say that there is a great deal of air being talked about this subject, most of which you would do well to ignore.

That might be a little too sweeping, because Prolog is rather a special language which is very different from the

AMENDMENT 5GL

usual run of third generation languages. Widely-used for experimenting and research in artificial intelligence, Prolog allows you to do things easily which, in a more conventional language, would have given you serious problems. To illustrate this, look at the figures which accompany this article.

First, try figure one and the program SOCRATES.PRO. Not much of a program but it illustrates the fact that Prolog is a declarative language rather than a procedural language. In a procedural language you tell the computer what to do. In a declarative language you declare to the computer that certain things are true, after which you can ask the computer questions about the knowledge which you have previously declared to it.

In figure one we have declared to the computer that Socrates is a man and that all men are mortal. As a result the computer knows that both those statements are true and also it can deduce that Socrates is mortal, which is rather more than we told it explicitly in the first place.

We can use a similar approach in figure two to carry-out a simple addition but here we see that Prolog is not particularly well-suited to this kind of problem, even though it can do it. Turn to figure three where we want Prolog to evaluate a factorial and we find Prolog elegant enough but perhaps not very obvious in the way it goes about solving the problem. This is in part because Prolog is far more at home handling statements in logic – specifically the first-order predicate calculus – than it is in handling maths. For maths, the conventional third generation languages, of which Basic is an example, are better.

Another reason why Prolog is not too good at maths is because it can be very difficult to tell the machine exactly what to do using Prolog. With Prolog you tell the machine that certain things are true and leave the machine to get on with making whatever deductions it thinks appropriate. Using this approach, it can be very difficult to tell the machine to do something simple. Look at figure four where there is Prolog code which enables you to input a string of characters and have that same string printed-out again on the screen. In Basic this would be accomplished using a simple INPUT followed by a PRINT. In Prolog you virtually have to trick the machine into doing something as simple as this.

Finally, look at figure five and you will see Prolog code which will tell you which railway route you should follow to get from one station to another – here Prolog really comes into its own.

The program is divided into two parts. The first consists of an inferencing mechanism which can work out the route from one station to another if it is given information about which trains run where. The second part is a kind of knowledge base which contains that information on the trains.

The advantage of this program, apart from the fact that it works, is that if the rail network is extended or altered the program can continue unchanged. All that must be altered is the knowledge base in the latter part of the program. So if a new line is opened between York and Euston all we need do is to insert the declaration: line(york,euston).

Subsequently, every single travel enquiry made of this program will take this new knowledge into account.

The advantages of this method of programming are obvious and, if automated travel enquiry machines ever appear on our stations they will almost certainly owe something to this style of Prolog programming. They may, however, not be coded in Prolog or any other so-called 5GL. Once a suitable method has been developed the end-product is often recoded, at considerable effort, in a more conventional language such as a third generation procedural language to obtain a faster implementation of the solution.

For all that, experimenting is fun and some very attractive and interesting problems can be solved easily using Prolog. It is unlikely to replace conventional programming languages entirely because, as we have seen, there are some things at which it is not very good. If you consider that final example in figure five and try to work out how you would code the same problem in a conventional 3GL such as Basic you will see why this particular 5GL was invented. For, like any computer language, there are certain tasks it performs so well that you would scarcely have thought of attempting them without it.

Figure 5. The program TRANS.PRO

```
run:-nl,write('Where are you starting
from?'),nl,read(Origin),nl,
write('Where are you going
to?'),nl,read(Destination),nl,
route(Origin,Destination,Route),
write('Your best route is:-
'),nl,write(Route),nl.
route(Origin,Destination,Route):-path
(Origin,Destination,Route,[Origin]).
path(Station,Station,[Station],_).
path(New
origin,Destination,[New_origin[Rest],
Stations_so_far):-
(line(New_origin,Next);line(Next,
new_origin), not
member(Next,Stations_so_far),
path(Next,Destination,Rest,[Next,Stations_
so_far]).
member(E,[El_]). member(E,C_IT]):-
member(E,T). /* The railway lines: */
line(Kings_cross,edinburgh).
line(Kings_cross,euston).
line(euston,stoke_on_trent).
line(Kings_cross,york).
line(york,scarborough). line(euston,stafford).
This program can be run as follows:
?-run. Where re you starting from?
scarborough. Where are you going to?
kings_cross. Your best route is:-
[scarborough,york,kings_cross] yes ?-run.
Where are you starting from? stoke_on_trent.
Where are you going to? euston. Your best
route is:- [stoke_on_trent,euston] yes.
```

Notes:

This shows the power of pure Prolog. This program will answer any travel query with a best route to follow from origin to destination via any number of intermediate destinations. Its knowledge of the rail network can be altered or expanded at will by modifying or increasing the line(,) declarations in the latter part of the program. The program will modify its replies automatically to allow for any such alterations.

In general, the program works by a 'divide-and-conquer' strategy in which the problem is broken into lesser journeys and an attempt is then made to solve the problem of those lesser journeys by breaking them into lesser journeys, and so on. This program is invoked by keying: ?-run. The program then tries to work out if "run" is a true statement. By using the word "run" in this way it provides a useful reminder of how you start the program, something which is not always obvious when you go to Prolog for the first time.



● The interface of the Plus D can handle 3in., 3.5in. or 5¼in. drives.

THE PLUS D DISC/PRINTER INTERFACE COSTS ONLY £50. SHOULD SPECTRUM OWNERS DENY THE DISCIPLE? CHRIS HANKINS DECIDES.

DRIVE FOR PERFECTION

The Plus D by Miles Gordon Technology sells for slightly less than £50. It contains what I would say are the more vital features of the Disciple. Plus D has a disc interface which can handle 3.5in., 3in. or 5¼in. drives which can be single- or double-sided and Plus D allows one or two drives to be used.

The system is set up from a cassette-based program which is not so strange as it sounds, because it allows more flexibility in choosing disc drives. Once you have answered the simple question asked by the system file program it will create a system disc for you. The system can then control your disc drive and your printer.

To run the disc operating system you must enter run either in 128 or 48 mode. This boots the system which is stored in the Plus D, so it is not affected or lost if you re-set the Spectrum via its switch.

The disc interface is compatible with Interface 1 and can handle all Microdrive syntax commands. You can load a file by entering LOAD *"m";1;"filename". It also has its own commands which are much simpler to use, LOAD D1 "filename". Files can be Saved, Loaded, Renamed, Catalogued and Erased – wild cards are allowed but not when choosing a filename.

FILES

Files can be copied but not Snapshot files. This is a built-in safeguard against pirating. The Snapshot function is simple to use; it will transfer virtually any piece of software to disc. You can take snapshot saves at any point in a game, which is very useful for adventure players.

There are three types of Snapshot file. After pressing the Snapshot file option, if you press key 3 a Screen save is made, saving only the current screen. It is just like taking a photograph for posterity, perhaps of your all-time high score.

Pressing key 4 will initiate a 48K memory save, saving a 48K program; and pressing key 5 will do the same for a 128 program. One thing I found annoying was that you are not given the opportunity to name your Snapshot file. The system does this for you, calling the file Snap A, Snap B and so on, and when you can have up to 16 Snapshot games on one disc it can be confusing. The Plus D system, however, allows re-naming of your files at a later stage, so you will not be completely lost.

A 48K program will load in about three seconds and when you have been used to waiting up to 10 minutes for a program to load this seems like instant loading.

The Plus D printer interface is a standard Centronics/parallel type. You will need a BBC-type 26-way ribbon connector cable. The Plus D has default settings for Epson-compatible printers, enabling it to work automatically with those printers. The system program used when you make a system disc also asks simple questions about your printer. If you choose to answer the questions the printer will be ready for use every time you boot-up the system.

It is possible to configure the printer interface to a non-Epson-compatible printer. You will need to answer the questions asked by the system program by using information from the printer manual but, if this defeats you, you can get help from INGUG, the independent users' group. Printing can be from standard basic syntax or from programs such as *Tasword 2*, making serious word processing possible. You can also produce screen dumps of normal size or double size. This is done via the SAVE SCREEN$ command – SAVE SCREEN$ 1 for normal size and SAVE SCREEN$ 2 for a much larger format.

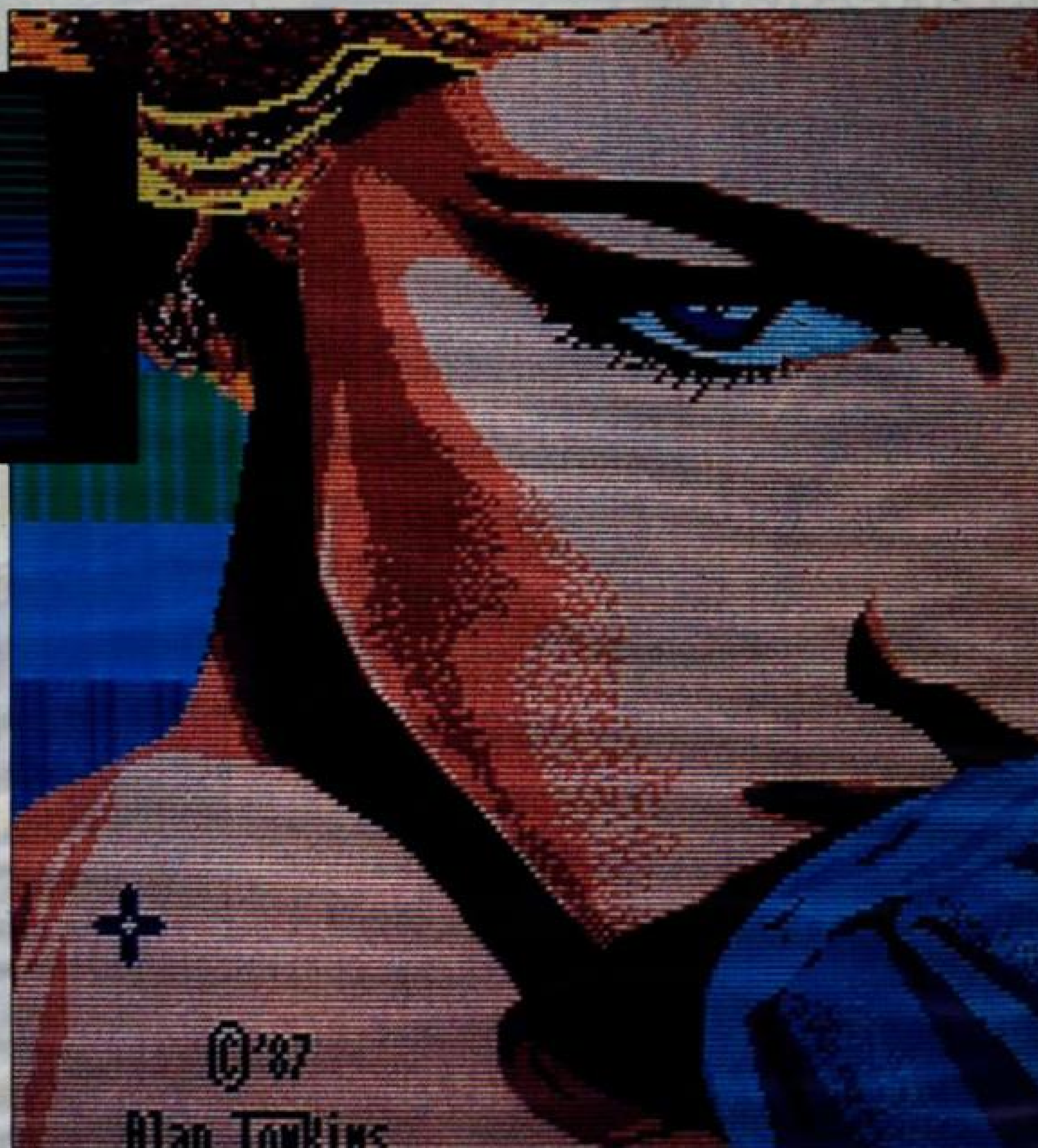
SERIOUS WORK

Programs for serious work which are known to be compatible with Plus D include Tasword 2, *Omnicalc 2, Power Print II, Disc Manager, The Last Word, Word Manager, Small Business Account, Pascal, Devpac* and many more.

The quality of the steel-cased interface with its power/indicator light and positive feel Snapshot button is excellent and the 3½in. Mitsubishi drive supplied as a special limited offer of £129.95 for the pair performed well and gave no disc errors. The system is a reliable alternative to tapes and a definite alternative for any Spectrum owner thinking of upgrading to a Plus 3.

Product:
Plus D disc/printer interface
Price
£49.95
Supplier
Mile Gordon Technology MGT
Address:
Unit 4, Chesterton Mill,
French's Road, Cambridge,
CB4 NP. Tel: 0223 311665





● **Above: The title screen demonstrates all 512 colours of *Quantum Paint*.**
● **Right: Who's that girl?**

AN ST GRAPHICS PACKAGE OF AMIGA STANDARD IS HERE AND IT COSTS LESS THAN £20. MARK ULYATT REPORTS.

ALL THAT COULD BE DESIRED

One of the major selling points of the Atari ST is the quality of its graphics. To help exploit that potential, numerous art and design packages have been produced for the machine. The number of such pieces of software now on the market has become so great that any newcomer to the scene will have to offer something fairly spectacular to make any impression whatsoever.

Enter *Quantum Paint* from Eidersoft. This newcomer has two features which will probably catapult it to the forefront of the art package market. Quantum Paint has four new colour modes which, on paper at least, raise the ST to the performance level of the Commodore Amiga.

RESOLUTION

Three of them operate with the ST running in low-resolution, the other when it is in medium-resolution. Low-resolution normally offers 320 x 200 pixels and 16 colours from a palette of 512. Quantum offers 128 colours from 512 in 512-colour and 4,096-colour modes. In medium-resolution there are 640 x 200 pixels in four colours from 512; you are allowed 32 colours from the 512-colour palette. Even so there are a number of limitations which cannot be ignored.

While 512-colour graphics packages are starting to appear in the States, none of them as yet can match the Quantum specification. Also, and far more important, Eidersoft will be selling commercial programmers' kits to enable Quantum Paint pictures to be used in other programs. For registered users a subset of those routines will be made available.

That is the entire purpose to Quantum Paint. There would be little value in producing work which could not be incorporated in other software in some way. The 128-colour mode, which suffers the fewest restrictions and allows for animation, could be put to great use, especially in the entertainment field.

All the modes have subtle differences in the way they use some of the program functions, so let us first look at all the drawing options available to the user. Instead of using drop-down menus, like many rival packages, Quantum Paint employs bas relief icons, similar in style to those used in *Pro Sound Designer* and *Pro Sprite*. There are two screens of functions, with the top of the display taken by brush styles, a palette and pots containing the foreground and background colours on both.

On the first menu screen a bank of 18 hold most of the drawing functions. All the regulars are there – lines, dots, eraser, frame, box, rounded frame, rays, polyline, polygon, circle, disc, flood and area fills, airbrush, cut and paste and copy, zoom and, finally, text options. Not a great collection but most of them work far better than equivalent functions in other packages.

For single pixel thickness drawing, dots and lines are drawn quickly and smoothly. When the thickness increases there is a substantial loss of fluidity. The rays option is something of a loser, as it does not repeat automatically if the mouse button is held down. Each ray must be selected individually, which is a little tiresome.

RESPECTABLE

Flood fills are respectable rather than spectacular but this function will not operate in the 12- and 4,096-colour modes – known as the Super Palettes – because of the way the display is produced. That is the excuse of the manual anyway. I see no reason why it could not have been implemented. It would have been complex to do but so much of Quantum Paint is complex, so why not?

Two of the best functions are cut and paste and the airbrush. Irregular shapes can be cut and pasted all over the screen, while the airbrush performs superbly. Rather than have three or so options regarding size and rate of flow, this airbrush features long sliders which provide a great deal of variety. At top speed the airbrush is very fast and impressive and a delight to use.

It is surprising that Eidersoft has included an animation section. The style is pure Pro Sprite, so if you are familiar with that program this will be usable immediately.

A screen is either designed or loaded and assigned a frame number. The next frame can either be an entirely new screen or can be a variation on the last one. If new screens are used continually there will be sufficient memory for only about 10 but if they are just continuing variations of each other it is possible to cram in as many as 100.

CLEVER

The reason for this is at once simple and very clever. Quantum Paint stores only the differences between the frames, not each frame in its entirety – unless a subsequent frame was entirely different.

There are options for cutting, altering the replay speed and saving the sequence to disc. Considering that this is a bonus feature it is very welcome.

Menu screen two contains much of the unnecessary as well as an important item like palette positions. The 128-colour low-resolution mode and the 32-colour medium-resolution mode – both work in a similar manner – use a system of interrupts to display up to eight strips of the screen with a different 16-colour palette each. The strips, or *palette areas*, cover the width of the screen and can occupy as much as the entire screen.

The first palette is always switched on but the others are switchable. To get the maximum 128 colours it is necessary to use all eight palettes and position them where you want. It is advisable to plan things before-hand, though, and then use only as many palettes as you need extra colours. It keeps the drawing process simpler.

Then it becomes complicated. The 512 and 4,096 Super Palette modes use most of the 68000 processing time just to maintain the display, so restrictions abound. While the prospect of using any of the ST 512 colours with the only restriction being a limit of 32-40 colours on any line sounds simpler than what has gone before, the real problem rears its head when you begin drawing.

PROCESSOR

With so much processor time being used to display an SP screen, the 68000 cannot run fast enough to enable you to draw on the SP screen. What happens is that two screens are used. The first is the one on which you draw, known as the draft, and is a standard 16-colour representation of the 512-colour SP screen. After a specified time the computer re-calculates the draft screen as an SP one and then re-displays it. To begin drawing again you are thrown back to the 16-colour draft screen.

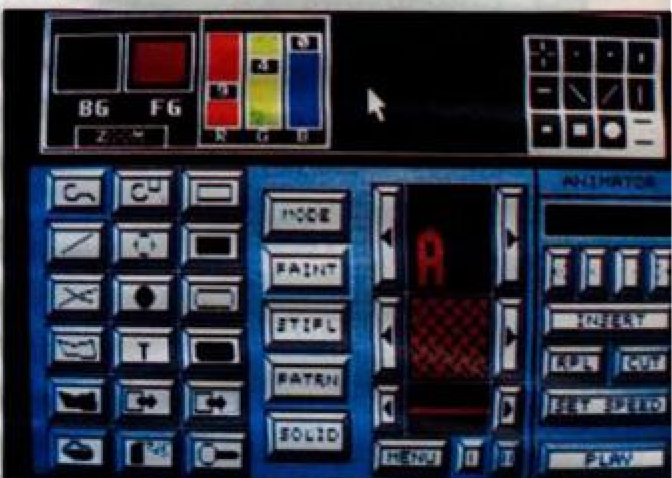
Trying to judge what the draft screen will look like when it is re-displayed is no easy task when you are working with many shades of the same colour in one area. That is because when a colour is selected with which to draw, Quantum selects the nearest 16-colour palette equivalent. Zoom and cut and paste are useful at that point, so it is a pity the zoom function has so little firepower.

The other SP screen offers a staggering 4,096 colours. They are produced by flashing colours on top of each other. On a 50Hz TV they flicker. This mode operates in the same manner as the 512-colour one, except that drawing is a little slower still.

To produce a picture worthy of using 4,096 colours takes a great deal of effort. Most people will probably be satisfied with 512. So far as incorporating the SP screens into your programs is concerned, the computer will be able to do little else except display the things.

It is possible to use Quantum animation facilities on these modes as well but it is advisable to have a 1,024K machine to make the exercise worthwhile.

By providing only a small but sensible



● **A menu screen from *Quantum Paint*.**

selection of drawing tools, David Jones, the programmer, has been able to concentrate on squeezing the most from the ST graphics and to produce an amazing product.

To produce pictures with this system may be far more difficult than by using any other graphics package but Quantum Paint offers more than any other package and the results can be correspondingly spectacular.

The two features which launch Quantum into the essential buy category for all ST owners and make it such a revolutionary product are that the Amiga standard screens can be incorporated into users' programs and the incredibly low price.

STILL LIFE

PETER WORLOCK ON A PERIPHERAL WHICH WILL TRANSFER VIDEO IMAGES TO YOUR AMIGA.

In a sense the development of the microcomputer in the last two or three years has been the development of computer graphics. From the text-based displays of a few years ago we now enjoy the full graphic displays of the Macintosh, Atari ST and Amiga, and of products like GEM on the IBM PCs.

A new product for the Amiga joins this burgeoning market, a video digitiser which allows you to capture video images and use them in virtually any Amiga software. The *Digipic* system is manufactured by JCL Business Systems and distributed by Precision Software, whose *Superbase* database package, not incidentally, is among the first to allow the storage of pictures and other images as well as textual data.

The digitiser is a large black box, about the size of two external disc drives, which connects to the Amiga parallel port. A cable from the video camera plugs into the rear of the Digipic unit and then you power up everything, load the software and start shooting.

Although the system is designed specifically to work with a video camera, you can use any other suitable video source, such as a video recorder, which is what I used for this review. A suitable cable is easily available from most hi-fi and electronics stores but I made one by butchering two spare TV interface leads.

Using the software is simple. If you are using a camera it helps to have a separate monitor in addition to the Amiga monitor for displaying the camera image. This helps with focusing, contrast and other initial setting-up. With a video recorder, of course, you can leave it hooked to the TV as usual.

When you have a suitable image you select Digitise from the menu bar and Digipic grabs a frame and displays it on the Amiga monitor. An additional video display is not essential, since you can have Digipic constantly grab a sequence of images and display them successively on the Amiga. When you see one you like you press the Escape key and Digipic keeps that one and breaks out of the loop.

I found the system gave excellent results from both TV signals and from pre-recorded video tapes. Digipic really works in mono and will give first-class black and white images using a 16-level grey scale. An additional adaptor is supplied to reside between Digipic and the Amiga which gives an extended 32-level grey scale and this produces correspondingly better images.

The only disadvantage to using extended grey-scale pictures is that the adaptor must be present on the Amiga whenever the images are to be loaded, even if you want to put them into another program. This means that you cannot pass on a disc of EGSA pictures unless the recipient also has the EGSA adaptor.



● **JCL Digipic (left) creates superb black and white images using a 16-level scale, as can be seen below and bottom.**





All this is not to say that Digipic cannot work in colour but the process is a little more complex.

Supplied with the package are three colour filters in red, green and blue. They are fitted to your camera and used in sequence. Digipic takes three images with the filters masking out the corresponding colours, and the three resulting pictures are merged to give a fairly accurate colour image.

How accurate they are depends on the quality of the camera, lighting, and having a rock-steady camera during the three shots. The results, the manual implies, range from excellent to poor.

The system is great fun to play with and provided you are prepared to do a good deal of work in touching-up pictures you can use them in a variety of programs.

If you are using a video recorder all the images available to you are strictly copyright and you could not use them in any commercial program.

Video production companies and others in similar areas will certainly be able to put Digipic to work but these are very small niche markets for the moment. Perhaps the most interesting use will be in compiling a video database. With a camera attached to a copying stand you could create a file of Amiga pictures – of photographs, book covers, technical drawings, architect's plans and so on. Estate agents could hold a database of properties for sale, complete with a picture of each house.

They can be compiled into commercial database packages, of which *Superbase* is only one, which support pictorial as well as textual data.

Then there is the immediate and obvious use in desk-top publishing. The quality of image produced by Digipic is eminently suitable for this purpose. Although the Amiga is as yet a minor player in the desk-top publishing field, it already has some excellent software, together with the essential laser printer drivers and other requisite bits and pieces. Coupled with an image processing system like Digipic, the Amiga may yet emerge as a first-class and cost-effective publishing system.

Product:
JCL Digpic
Price:
£299 plus VAT
Supplier:
Precision Software,
6 Park Terrace,
Worcester Park,
Surrey KT4 7JZ.

BACK-UP UTILITY FOR ATARI ST

ProCopy is the backup utility that copies all disks, at the press of a key, even the most heavily protected.*
With original disks in everyday use it's all too easy to damage your valuable software, wipe-out essential data, or overwrite the disk with garbage.
But now, you can use ProCopy to make a working disk — add your favourite desk accessories, printer drivers and other files to it — and put the original disk safely away.

Fast and easy-to-use

Automatically adapts to available memory and disk drives

Fast format-and-copy routine saves time

Multiple copying without re-reading the source disk

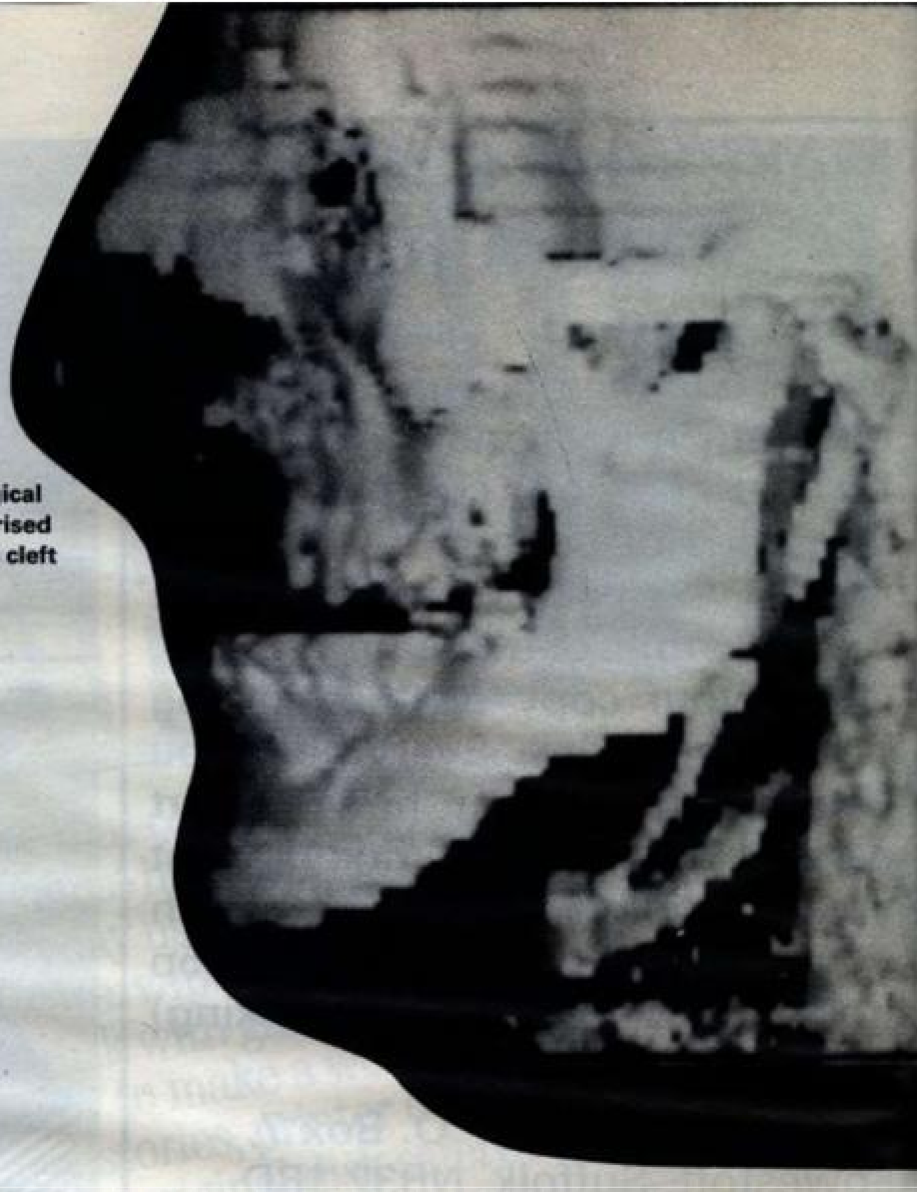
Analyse option lets you examine disk format

THE Moving Finger C·O·M·P·A·N·Y

Price £34.95

The Moving Finger Company
Building 2 Shamrock Quay Southampton SO1 1QL Tel:(0703) 229041

*Upgrades will be available to handle new methods of protection.



● A pre-surgical transputerised image of a cleft palate.

WITH THE AID OF TRANSPUTER CO-PROCESSING, FACIAL SURGERY CAN BE PERFORMED ON COMPUTER BEFORE THE OPERATION TAKES PLACE. JOHN DAWSON REPORTS.

CHANGING THE FACE OF SURGERY

On-screen it looks as if the special effects people from *Star Wars* are going into bio-engineering. A light orange skull is building its full detail and over it appears a deeper red skin cover. A professor explains that he is moving the jawbone on the computer to try it before cutting into the real patient. This is *The Chip*, the first of a series of films made by Software Production Enterprises about the current and future uses of microtechnology in the U.K. It is a documentary film, not science fiction, and the computer-generated skull belongs to a living person who is being treated at University College Hospital, London.

In 1980, Dr Alf Linney was a medical physicist using a small Hewlett-Packard 2100 computer to plan the use of curative X-rays for cancers in the head and neck. The output from the computer was displayed on a Tektronix 4010 vector graphics display unit. The technique of vector graphics has almost been superseded by raster graphic displays which construct an image by storing information about every picture element in the display.

Thus a 1,024 x 1,024 pixel display requires 1MB memory to record the presence or absence of light at each point. A white line stretching across the screen needs 1MB memory, for the blackness in every other point must be stored and displayed explicitly. By contrast, a vector graphic display leaves the display black everywhere except where a line is drawn. Vector graphics are extremely economical on memory, as the image is stored as a series of plotting commands. The straight line across the screen might require only eight bytes of information in a vector graphics display, two bytes each for the two numbers describing the start of the line and two bytes each for the two numbers marking the end point.

PEN PLOTTER

The cathode ray tube in the display is used like a pen plotter and can be an ordinary oscilloscope. The beam of the CRT is moved to a certain position by sending two numbers to the display, the X and Y axes, and the computer sends a pen-down or turn-the-beam-on command by switching on the Z axis input on the display. More numbers are sent on the X and Y axes and the beam moves to a new position for each new input. When the end point of the line is reached the computer switches off the beam – and moves to the starting position of the next line.

If the process is repeated fast enough it is possible to create an image on the CRT screen which looks like a line drawing, rather like the spaceships in the game *Elite*. In the early 1980s, Linney used those techniques to plan how to delivery the necessary dose of X-rays to a point inside a patient's head without harming radio-sensitive structures such as the eyes which might be closed by, or in the path of less carefully-directed beams.

Now Linney and professor James Moss can manipulate as much as 16MB of data in a single coloured image, twisting and turning their computer model to see what will be the result of bringing the jaw forward and down a little or how a cleft palate or malformed teeth can be repaired most effectively. They are using a T800 transputer, the fastest of the parallel processing chips made by Inmos.

The T800 chip runs at about 20MHz and achieves about 10 million instructions per second. With one transputer it takes about five seconds to generate one image. Using six T800s in parallel the same image can be re-calculated in one



ERY

second and the skull and overlying soft tissues and skin can turn slowly from side to side on-screen.

The pixel graphics in the new system at University College Hospital have several megabytes of data in each image. The only way to create an image of this complexity is by the automatic acquisition of data – you could not enter anything like this by hand. The information is taken from a series of X-rays which slice through the patient's skull, each one presenting a picture of a 1.5mm. thick section

Computerised tomography was invented in Britain and exploited in the States. The technique uses low doses of X-rays which are detected by an array of sensitive counters which provide the inputs to a computer. In an ordinary CT scan you will see a picture which looks as if you had sliced horizontally through the patient's head or body.

Bone is the most dense structure and shows up white; air in the passages of the nose and mouth is the least dense and shows as near black. What Linney's transputers do is to assemble a number of CT scans or slices to create a solid 3D image which can be modified to see the results of different cuts in the bones and soft tissues.

DETAIL

Where the detail in the final image is less important and the risk of the X-rays is greater – near the eye or the pituitary gland – the depth of each slice is increased to 3mm. or 6mm. Nuclear magnetic resonance, also known as magnetic resonance, is an imaging technique which uses radio-frequency energy rather than X-rays. The smallest object which can be shown on magnetic resonance imagers depends partly on the strength of the huge superconducting magnet in which the patient lies while the examination is carried-out. At UCH they can obtain a resolution of 1cm. at present.

A recent article in the *International Journal of Technology Assessment in Health Care* said that current video monitor technology is barely supporting spatial resolution of 1.25 line pairs/millimetre on a 14 x 17in. matrix – the equivalent of a 1,024 x 1,024 picture matrix – whereas spatial resolution on plain X-ray films is limited only by the eye.

● A slice through the skull also showing a cleft palate.



Even at the current level of spatial and contrast resolution, each standard chest X-ray would require 10.5 million bits of digital information. Users' evaluations of digital radiography should depend on the impact of reduced resolution on the accuracy of medical diagnoses. Preliminary studies have indicated that a 1,024 x 1,024 picture matrix provides only a slight degradation in sensitivity and specificity of diagnosis of chest X-rays. The paper also says that the doctors do not like the video images and want more information than the objective information warrants.

PROBLEM

That is not a problem at UCH. The images produced by Linney can be displayed in a high-resolution 1,024 x 1,024 mode but for many purposes the researchers tend to use one-quarter of the screen for each of four images. It is possible to display the bone structure alone, another image of the soft tissues – the fat, connective tissue and skin – and then to combine the two.

Each image is made from stacks of cubes and the latest techniques smooth the boundaries between the edges of the cubes to give a seamless picture on screen. Linney says that it is important to be able to switch off the smoothing program, as you can lose small irregularities, a small malignant or cancerous tumour, which was resolved by the CT scans but eliminated in the subsequent processing.

There is no formal shadowing introduced by the transputers but the video images have an impressive 3D look as they rotate to show one side of the face and then the other.

The technology is maturing at UCH and now the outcome of cosmetic surgery and orthodontic operations is being checked against the pre-operative intentions of the surgeon. It is not considered ethical to subject a patient to another series of CT scans after an operation only for research purposes but it is possible to use a further technique, laser scanning, to re-construct the new external contours of the face.

It is all a long way from drawing lines on a CRT using minimal data and yet there is a solid, coherent progression from one to the other. The principles involved in the early application are not so far removed from what Linney is accomplishing now; he is just better able to express his ideas because the technology has moved on.

As a result of the film made by Software Production Enterprises, the Wolfson Foundation has supported Linney, Moss and their colleagues. Their ability to help patients will be secure for a time and they can continue to develop the techniques of checking the outcome of surgery on a transputer before doing it live.

Technology Assessment in Health Care also said that "realisation of the promise of digital imaging is still in the future." That may be true in many cases but what Linney and Moss have achieved at UCH is a substantial step into the future.

The Raven

Title: The Raven
Price: £5.50
Machine: 128K Spectrum only
Publisher: Eighth Day Software, 18 Flaxhill, Moreton, Wirral, Merseyside LA6 7UH

We enthused about *Ronnie Goes to Hollywood*, so in the latest Eighth Day release it is good to see it ignoring commercial considerations and getting its teeth into a massive adventure available only for Plus-2 and Plus-3 Spectrums. What is more, as well as a 20-page booklet it is essential to read, you also get a program telling you how to play adventures and two playable snippets of future Eighth Day releases, the intriguingly titled *The Weaver of her Dreams* and *Ardonicus III*. Full marks for value.

The Raven is a graphics adventure written using Gilsoft *PAW*, the first of a series of planned detective tales. In it you play Sherlock Holmes and the game seems to have all the complexity and none of the bugs of the Melbourne House *Sherlock*, the program greeted with such acclaim in its day. For me The Raven is better.

The year is 1893 and Holmes has received a letter from Professor Vybes, a man known for his interest in the criminal mind. He has invited Holmes and others to his house on Friday evening at 7pm to hear the announcement of what Vybes claims to be a remarkable new method of treating hardened criminals. When the game begins it is 6pm and Holmes is in a bookshop collecting a copy of Vybes' latest tome prior to making his way to the meeting.



• ***The Raven*, the latest game from Eighth Day Software, is an undiscovered treasure.**

It is just a little before six and the time and day are displayed on-screen at each location. The time element is vital, as the game is in a very convincing simulation of real-time. At six o'clock sharp the bookseller shows you the door and shuts the shop if you have not left by then. The door is closed promptly and this and other locations will be barred to you at night-time.

Similarly, certain characters have fixed movements and, as happens in many an Infocom detective tale, you have to be in particular locations at particular times to listen to conversations to meet other people and question them.

As the tale unfolds – and the text is authentic and mostly well done – you meet Vybes' latest experimentee, Edgar, a hardened criminal whom Vybes claims to have cured by his new method, that night at Vybes' home, though two murders are committed. It would have been three but Holmes, the intended third victim, was alerted by an ally. The first task is to clear Edgar, whom you know to be innocent, and then find and prove the case against the real murderer.

You can switch between two speeds: the FAST mode is suitable for times when nothing much is happening and you are perhaps waiting for someone to arrive at a particular place. You can use the speech facility to talk to other characters and elicit information, perhaps even illicit information – who can you trust?

A few errors in the text mar the presentation a little and some of the messages scroll up behind the graphics much too fast but, quibbles apart, this is an entertaining and enterprising adventure no 128K owner should be without.

Mike Gerrard

4th & Inches

Price: £9.95 (tape) £14.95 (disc)
Machine: Commodore 64
Publisher: U.S. Gold

There are 10 seconds left on the clock. You are 17-14 down and on the opposition two-yard line. It is fourth and inches. Do you go for the winning touchdown or pick up a sure-fire field goal? That is just one of the situations which can occur when you are playing *4th & Inches*, the latest Accolade game to be marketed by U.S. Gold.

It follows in the tradition of *Hardball* by having a set of fictional teams, with each player having a substitute. Game quarters can be of five, 10 or 15 minutes, the latter option making the experience last something like 90 minutes in real-time.

The graphics on the pitch are presented from an angled side on perspective, the kind of thing you would see from the stands. The players appear in the huddle and you are asked for your formation at the bottom of the screen.

Five options are presented from a total of 11. The computer offers all the formations and plays based on the field position. Sometimes its offerings can be a little sus-

pect. I am all for surprising the opposition.

Having called the formation, the team sprints to positions and you must select the play from a list of 14 passing, 10 running and four kicking plays. After that you select which player to control initially.

The quarterback glances up and down the line of scrimmage and the teams spring into action. Then you reach some of the best features of 4th & Inches. If you select a running play the quarterback hands off and you are then in control of the runner.

If you choose a passing play you take control of the quarterback and decide when to release the ball. Or, and even better, if a gap opens you can pretend to be John Elway and sprint up the field. You are not allowed to move off the screen until you have crossed the line of scrimmage.

The best piece of deception is in the form of the fake punt or field goal. You can even have the punter catch the ball and run with it. There are two features we have waited a long time to see.

On defence it is possible to call blitzing plays and either take the part of the player grunting towards the quarterback or another member of the defence and patrol another section of the field. This is the best way to pick up interceptions – use a fast safety to shadow the enemy receivers.



Helmets clash at the line of scrimmage in *4th & Inches*.

While 4th & Inches does not capture all the realism of the game of American football it is a very exciting and entertaining implementation of the sport.

Mark Ulyatt

Enduro Racer



● **Hogs on the track in *Enduro Racer*.**

Price: £19.99
Machine: Atari ST
Publisher: Activision

ST owners have had to wait a long time for their version of the Activision conversion of the Sega arcade winner, *Enduro Racer*. The graphics were always to be the best thing about this version and it is fair to say that they are. Not that it is a bad game – simply that Enduro Racer looks very good on the back of the inlay card.

Enduro Racer is all about racing on a bike through five sets of scenery and finishing each course before the timer runs out to progress.

The controls are relatively simple, consisting of left, right, accelerate, brake and wheelie – it is Eddie Kidd time as your biker approaches a ramp and a safe journey is guaranteed. If not it can be one-way-ticket time.

Particularly agile bikers need not avail themselves of the ramps but, considering that piles of hungry rocks are usually waiting just beyond to devour the careless and the incompetent, it is a skill worth mastering.

The major feature of Enduro Racer is not the ramps, the varied scenery which flashes past, or even the tight bends and gentle curves of the track but rather the undulating surface. Alas, this feature has not been implemented well.

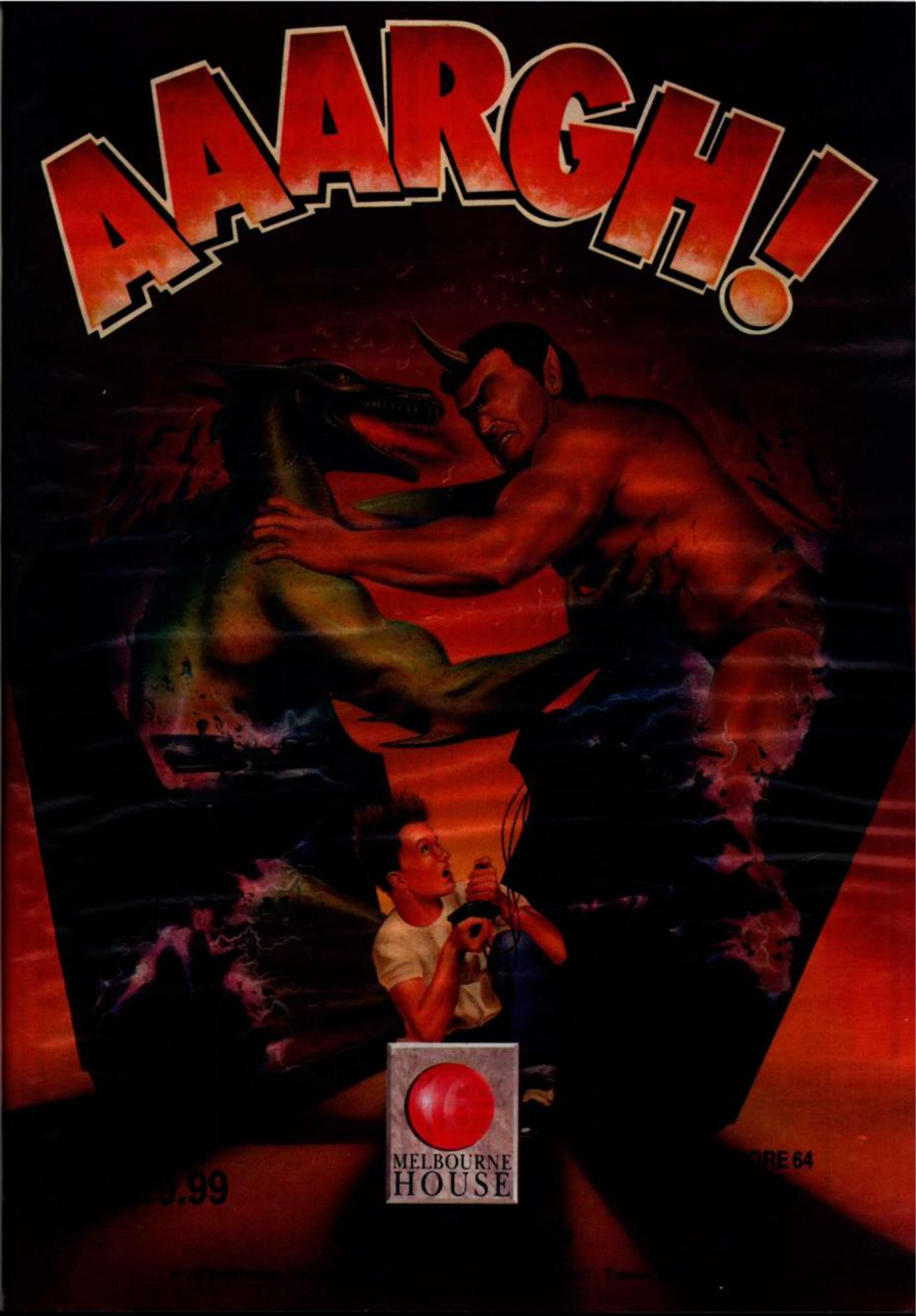
The track ahead does the business but at the front of the screen your biker's vertical position remains constant. The result is that the illusion of rising up the inclines and tearing down the declines is not carried through effectively.

Besides obstacles and time, the other hazard is in the form of other racers. Running into them is not fatal or the game would be unplayable but rather you lose speed and vital seconds are wasted.

To accompany the racing a completely inappropriate jingle beats along in a tinny way. It is very much a David Whittaker on a bad day effort.

As to playability Enduro Racer is difficult but scarcely impossibly so. The trouble is that it is not exciting. The fact that the number of 3D racing games for the ST can be counted on the fingers of one hand may induce purchasers to buy the Activision game on the strength of the graphics. Given the competition it would not be such a bad choice but Enduro Racer should still deliver more in the entertainment department.

Mark Ulyatt.


AAARGH!
MELBOURNE
HOUSE
.99
ORE 64

ADVENTURE PLAYGROUND

MIKE GERRARD MOUNTS A SOAPBOX TO COMPLAIN OF THE ALARMING INCREASE IN BUGS IN ADVENTURE GAMES.



When I decided the subject of this month's column I thought it was time for an airing of views on the subject of bugs, since when several more instances of the wretched creatures have crawled from the woodwork.

This will not be one of those articles containing amusing little collections of bugs. I wish that the humorous type of article was the only one which one ever needed to write about bugs but it seems that gone are the innocent days when bugs made you laugh and you could feel you had caught out the programmer if you discovered you could take the dagger out of the trunk 8,000 times and still keep going.

Nowadays the situation is more likely to be that you cannot take the dagger out of the trunk at all, even though it is in front of you and you need it to complete the game. There have been more and more instances lately of the fatal bug, with several adventures released recently which it is impossible to complete because of some fault in the program. I think it is about time that the publishers of those games put their software houses in order.

One problem for some publishers, of course, is that as the machines get bigger and we demand that publishers fill all those Ks with adventure, the games become exceedingly complex and consequently more difficult to debug.

If all you can do with a dwarf is throw an axe at it, that is a comparatively simple feat of programming but when the programmer tries to allow the player to do anything under the sun to the dwarf, from committing carnal acts to discussing the theory of relativity, whole teams of bug-blasters need to be introduced to eliminate the potential problems.

It used to be that if a player found a bug in an Infocom game he jumped up and down with excitement and told the world about it, because its adventures were thought to be almost perfect. I raised this subject with Dave Lebling of Infocom on one of his visits to Britain last year but he claimed that Infocom games have never been as immaculate as they were believed to be.

"I would guess," he said, "that there has been at least one bug in every game we have put out. Some of them are very obscure, which the average person would never encounter in months of playing, but I feel they have always been there – but it just took people longer to find them.

IMPOSSIBLE

"Also, as the games sell more, of course, there is more chance people will find the odd bug which creeps in. I would say it was almost impossible to produce a totally bug-free adventure but we do a great amount of play-testing on Infocom games to make them as near perfect as possible."

I put it to Lebling at that time that perhaps Infocom standards were slipping a little, as *Hollywood Hijinx* had just been released and it contained two spelling mistakes. Now bugs are one thing but spelling mistakes were something you did not see in an Infocom game. He maintained that the play-testing was as rigorous as ever and attributed the spelling mistakes to an aberration combined with the fact that the author of *Hollywood Hijinx* was not the world's greatest speller.

I was able to add weight to my argument more recently, however, when Lebling's own latest adventure, *The Lurking Horror*, was released. It contained one bug I encountered and further evidence that the parser needs perking up a little.

In one room where there are some posters on the wall. If you try to READ POSTERS you are told that "You can't do that to a posters". Now it is obvious what is happening. There is a multi-purpose "You can't do that to a ———" response, which is filled in with whatever word you type. Unfortunately 'posters' is plural, so clashes with the grammar of the sentence.

The bug in The Lurking Horror happens in one location where you can jump up and cling to a cable but you can cling there only for a few moves before you fall back to the ground automatically. I discovered that if you jump to the ground from the cable before the number of moves was up, you get a double response from the program. In other words, "You fall to the ground. You fall to the ground." I put the bugs to Lebling and this is what he told me:

"The double-response bug is one I was sure had been squashed. To get technical about it, the cable from which you are hanging is what we call a 'vehicle', in that it is able to handle inputs. Vehicles, such as boats or balloons, want to treat certain inputs specially and the cable is like them in that respect.

"Unfortunately, vehicles get to handle inputs in more than one place in the main loop of the game and the cable was not always noticing that it had handled an input once and did not need to continue. Also, the timer which causes you to drop automatically was not always being turned off when you drop, so it was getting hit from all directions."

"So you see the problems when you try to turn a cable into a vehicle and also inject it with a degree of artificial intelligence: but what about 'a posters'?

VOCABULARY

"The 'a posters' bug is not a parser bug but rather a vocabulary bug. The posters in the Terminal Room are what we call a pseudo-object, meaning that it does not have the same level of detail as a real object. The game was so large that there was no room for every object mentioned in the text to be referenceable. In any case, the posters, being psuedo-objects, could not have the piece in them which says to use a plural, or not to use an article when mentioning them in a response."

You cannot please all the people all the time and Anita Sinclair of Magnetic Scrolls also explained to me recently about some of the problems there have been in extending its parser.

"I think you have to accept," she told me, "that you can never really win but just do your best to make the parser as good as you can. It used to be the case that if there was an object in a location description but it was not in the game, such as something like 'On the wall there are magnificent paintings', and the player tries to take the


Bugs
B u G S
Darn it — another game with a fatal bug
not again Barney
open X

ADVENTURE PLAYGROUND

CONTINUED

paintings, often the program would come back with an illogical response like 'You can't see that here'.

"What we do now with our system is go through the entire text at some stage and pick out all the nouns and try to ensure that the player at least gets some kind of sensible response, even if it is only a simple 'You can't get that'."

That is what Level 9 has tried to do with its blanket response of "Ignore that. It's just scenery." As she explained, though, even that is not the end of the matter.

"We thought by doing that that we had got rid of all the letters from people who write and say 'I tried to get this object that appears in the location description but I couldn't'. What we get instead are letters from people who write and say, 'There's a candlestick in one of your pictures but when I try to get it the program says it's not there'.

GRAPHICS

"So what we have to do next is to try to go through all the graphics and make sure everything in them which is recognisable, along with any synonyms, is recognised and acted on in the correct way. How far can you go, though? You sometimes realise you are trying to cater for the very small percentage of people who will notice those things. There are memory restraints, of course, and if you keep going you will end up with the world's best parser and a game with one location."

I agree and feel that the majority of players will not mind the occasional hitch, so long as it is only occasional. What has started to concern me lately is the number of games containing fatal bugs preventing the completion of a game. Ironically, they are not appearing from people like Infocom, Magnetic Scrolls or Level 9, writing ever-larger adventures with ever-improving parsers on ever-expanding micros. They are mostly on standard home micros like Spectrums and Amstrads and are more limited adventures for which there is less excuse to be so severely flawed.

KENTILLA

The first instance was *Kentilla*, an adventure written by Derek Brewster, who is well-known as a programmer and as an adventure columnist in one of the Spectrum magazines. Kentilla was originally released successfully some years ago and then was re-released last year by Mastertronic at a budget price.

Unfortunately for everyone – Brewster, Mastertronic and purchasers alike – the re-released version, though seemingly identical in every respect to the original, had somehow acquired not one but two fatal bugs. In one location you can see a silver dagger in a chest, a dagger which you will need if you are to complete the game successfully, but which the program will not allow you to pick up. Is this a dagger I see before me? Yes. Well, get the dagger then. Unfortunately you cannot.

Elsewhere you need the co-operation of one of the other characters to kill an adversary but in this budget version the character will not co-operate, leaving you unable to defeat the adversary and unable to complete the game – apart from the dagger problem.

At least Mastertronic seems to have been behaving honourably and has been offering refunds to those who write to complain.

However those fatal bugs get into the programs, Kentilla is sadly far from being an isolated case and all have happened in the last few months, which suggests to me a distinct lowering of standards and a lack of concern by some software houses for the customers who keep them in business.

Soon after that there was a bug in the Spectrum version of *Murder off Miami*, the adventure written by Delta 4 and published by CRL. Having played the CBM64 version, I was surprised to get the Spectrum version and to discover that every time I tried to stand up in my chair at the start of the adventure, the program looped me back to the beginning and began all over again.

LETTER

CRL did not respond to my letter querying this – just as Mastertronic ignored a similar query on Kentilla - but it quickly published an amended version of the adventure in which it was possible to move out of the first location.

Also from Mastertronic on its Bulldog label at £2.99 is an excellent new adventure, *Rigel's Revenge*, programmed by a team called Smart Egg Software who are among the brightest young adventure writers around. While most machine versions of this game are faultless, it seems that a bug has crept into the Amstrad CPC version, so again Mastertronic will need to get the refunds chequebook out of the drawer.

The Spectrum version of the AdventureSoft *Temple of Terror* is a very enjoyable adventure marred by a bug near the end which prevents the player seeing the adventure to a successful conclusion. In a game costing £9.95, the customer is entitled to feel aggrieved as it is not an easy adventure and to get almost to the end, only to discover that the game cannot be finished, is like getting to the end of a whodunnit and discovering that the last page has been torn out.

Then there is the latest release of an adventure first written several years ago, *Savage Island II* by Scott Adams. His early adventures were all text-only but for some reason the two Savage Island adventures were re-published recently with added graphics for the Spectrum and it is the second of the two adventures which, again, has a fatal bug in it.

As if all this was not enough, I received a letter from Ron Rainbird detailing even more fatal bugs. His is a name which will be familiar to many adventurers as he writes and reviews for adventure fanzines like *What Now?* and *Soothsayer*. The problems this time lie in the Atari versions of two role-playing adventure games published in the U.S. by SSI Fantasy and marketed in the U.K. by U.S. Gold, *Question* and *Phantasie*.

EXCELLENT

Rainbird describes Questron as an otherwise excellent game but the problem with it is that it lacks a trumpet. Many adventure games do, you might say, but this happens to be a magic trumpet and must be blown to dispel some fog you need to avoid. On going to the chest where he has learned that the trumpet is to be found, Rainbird discovers that the chest is empty. U.S. Gold contacted the American publisher, which confirmed that the player should not be getting that response and therefore his version must be faulty. The trouble is that so is the replacement version.

Again, this was a game he was enjoying thoroughly and being a clever type of a chap, he made his way right to the penultimate dungeon, at which point the game hung up on him.

Before entering the dungeon he was told to insert Disc One in the drive but on inserting Disc One he was told he had inserted the wrong diskette and he should insert Disc One in the drive, and so on in an endless loop. In addition, he discovered that two scrolls in the game which should display some vital information merely display a screen which is blank except for the word 'Return', though the contents of the other 18 scrolls in the game are displayed for all to see.

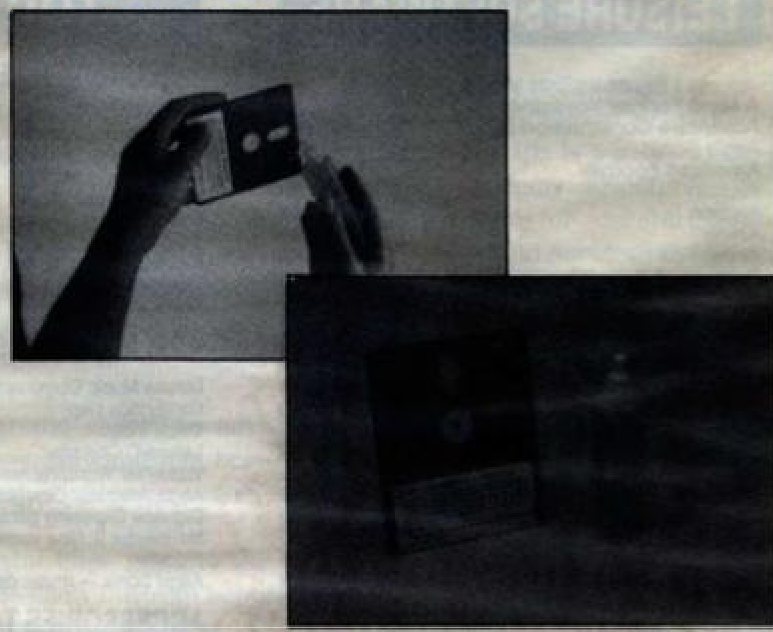
Rainbird wonders if owners of either Atari or other machine versions have experienced similar problems with these games, or if anyone has found a way to circumvent the problems with POKEs or other routines. If so, contact him at 62 Coniston Drive, Holmes Chapel, Nr. Crewe, Cheshire CW4 7LB.

If you know of any other fatal bugs I have not mentioned, let me know so that others can be warned about them before parting with their money.

FREE BINDERS

Take advantage of our stockroom clearance and send for a binder which will hold 12 copies of your favourite magazine. Just send £1 for each order to cover postage and packing.

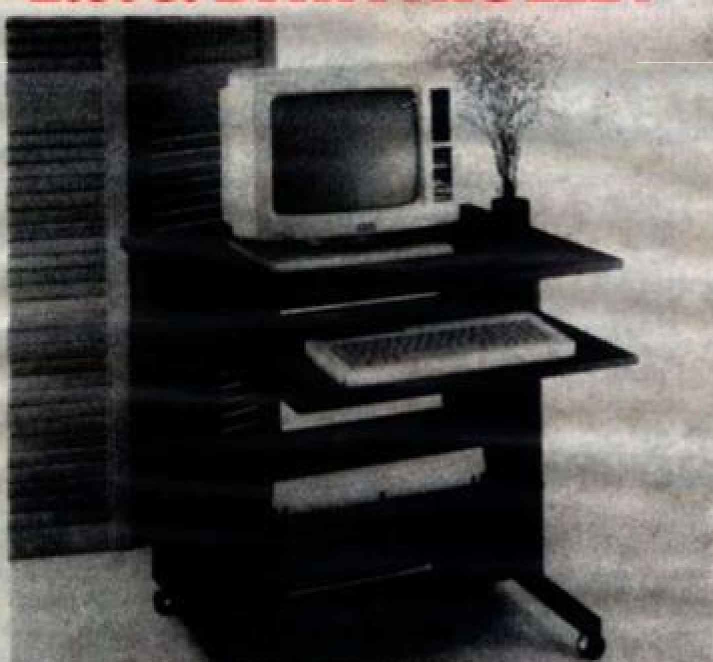
YOUR PCW NEEDS A 'CLEAR HEAD'!



At last SBS have produced a badly needed drive head cleaning kit. Disk drive heads constantly pick up harmful contaminants such as smoke dust and oxide particles from the disc itself. The heads should be cleaned weekly to prolong the life of your drive and protect data. Until now, there has been no cleaner on the market so there must be a lot of dirty PCWs around!

'Clearhead' comes complete with 3" cleaning diskette and cleaning fluid, and as a special offer to our readers, you will also receive a FREE SCREEN CLEANING KIT.

E.J.C. DATA TROLLEY



Part of the Elliot James range of high quality computer furniture, beautifully finished in black satin, the **DATA TROLLEY** is a mobile unit which houses a full size PC, monitor and disc drive, with two slide-out shelves for keyboard and printer. In addition to these, there is a fixed paper shelf and printout collection tray. Ideal for a business computer or for the younger enthusiast's games.

Dimensions in mm.
Width: 738
Depth: 384
Height: 720

PRICE £59.95 (+VAT £8.99)

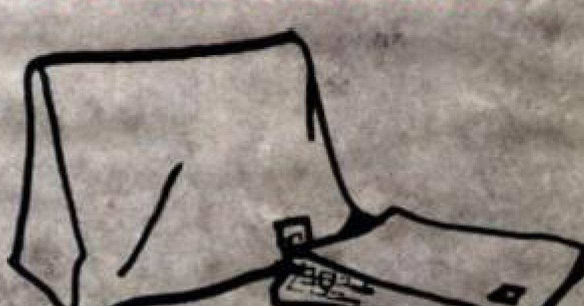
VERSATILE MINI-VAC



The most efficient way of cleaning those awkward places where dust accumulates, damaging delicate components. Complete with assorted nozzles.

£7.95 (P&P £1)

DUSTCOVER SETS



Made from high quality silk vinyl with fully bound edges.

PC Set	**£11.95**
PCW Set	**£9.95**

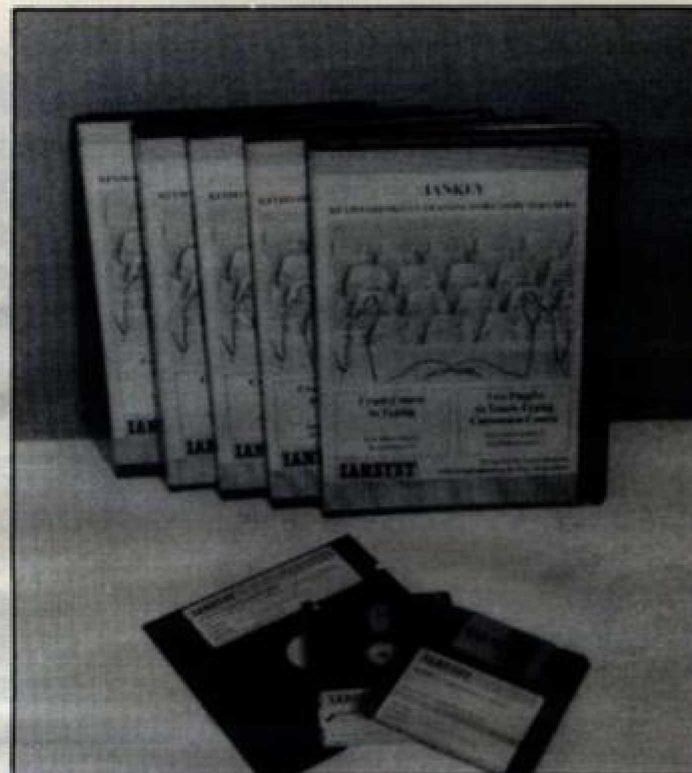
KEEPING IN TOUCH WITH TYPING

Two very useful programs from IANSYST for PC owners who would like to improve their typing skills.

IANKEY "2 Finger" Touch Typing Conversion Course, is for those who have no formal typing skills but know their way about the keyboard. This program is unique in helping experienced users convert painlessly to fast and accurate touch typing WITHOUT LOSING SPEED in the process.

IANKEY for BEGINNERS gives a basic grounding in touch typing in as little as 2-4 hours and includes plenty of practice material to build up speed.

Special Price for Your Computer? readers £27.95 (p&p £2.00)



YES Chancellor!

by Tom Tuite

Produced by arrangement with Chalksoft Ltd.



AMSTRAD
PCW 8256/8512
CPC 664/6128

ECONOMIC SIMULATION
complete with inflation, strikes, runs on the pound, election fever . . .

TOPOLOGIKA

A brand new game from TOPOLOGIKA which puts YOU in the role of Chancellor of the Exchequer! How many times have you thought you could sort out the economy, given half a chance? Although a highly enjoyable game, serious students of the economy can learn a lot from this package.

PCW Version £12.95
PC Version £15.50

ORDER FORM (YOUR COMPUTER APRIL)

Please tick the items you require from the list below and allow 28 days for delivery.

NAME ____________________

ADDRESS ____________________

____

____

____________________ Postcode ____________________

Yes Chancellor		
PC Version	£15.50	☐
PCW Version	£12.95	☐
Clearhead Cleaning Kit	£ 9.95	☐
Touch Typing		
(Beginners)	£29.95	☐
(2- Finger Conversion)	£29.95	☐
Data Trolley	£68.94	☐
Mini-Vac	£ 8.95	☐
PCW Dust Covers	£ 9.95	☐
PC Dust Covers	£11.95	☐
Subscription U.K.	£15.00	☐
Overseas	£30.00	☐
Free binders	£ . . .	☐
TOTAL ORDER	**£**	

Payment is by (please tick)

Cheque ☐ Postal ☐ Access ☐ Visa ☐

Made payable to Focus Magazines Ltd.
My credit card Number is

____

Expiry Date ____________________

Send this form together with payment to:

Focus Salespoint
Focus Magazines
Greencoat House
Francis Street
London SW1P 1DG

TELEPHONE ORDERS

01-834 1717

Anne Arnold

FREE P&P IN UK!+ **ABACUS ST BOOKS** +PRICE MATCH–SEE BELOW+

Peeks and Pokes	£12.95p	Tricks & Tips	£12.95p
Atari ST for Beginners	£12.95p	BASIC Training Guide	£12.95p
LOGO User's Guide	£14.95p	BASIC to C	£14.95p
GEM Reference Guide	£14.95p	ST Internals	£14.95p
Graphics and Sound	£14.95p	Intro to MIDI Programming	£14.95p
Machine Language	£14.95p	3-D Graphics	£16.95p
Disk Drives – In & Out	£16.95p	Optional Diskettes	£8.95p

SAVE £'s!+ **ABACUS ST SOFTWARE SALE** +STOCK CLEARANCE!+

PaintPro ST	£37.50p	PaintPro ST Library #1	£19.95p
ChartPak ST	£37.50p	DataRetrieve ST	£37.50p
TextPro ST	£37.50p	Forth M/T	£39.95p
AssemPro ST	£39.95p	PC Board Designer	£144.00p

AMIGA COMPUTE! BOOKS

Kids & the Amiga	£12.95p	Amiga DOS Ref. Manual	£12.95p
Elementary Amiga BASIC	£14.95p	Advanced Amiga Graphics	£14.95p
Amiga Programmers Guide	£14.95p	Amiga Applications	£14.95p
Advanced Amiga Basic	£16.95	Optional diskettes	£9.95p

+PHONE FOR MEGADEAL+ **CUMANA DISK DRIVES** +TELE 0706 43519 NOW!+

CSA 354 Atari ST	1 MEG 3.½	Inch Sincle Drive	£PHONE
CSA 358 Atari ST	2 MEG 3.½	Inch Dual Drive	£PHONE
CAX 354 Amiga	1 MEG 3.½	Inch Single Drive	£PHONE

+ALL CUMANA DRIVES COME WITH 1 YEAR WARRANTY – PHONE FOR BEST DEAL+

+SAVE £'s+ **TIMEWORKS ST DESKTOP PUBLISHER** +LATEST VERSION+

The very latest version of this popular Desktop publishing program, now works with the 520STFM. For further details write or phone for information sheet, or order Now! (Softline **£19.95** extra). Only **£74.95p**

+AMIGA & ST+ **PSYGNOSIS GAMES OFFER** +Work on ALL ST's)+

Obliterator	£15.95p	Terrorpods	£15.95p
Barbarian	£15.95p	Deep Space	£15.95p

Arena & Brataccas £19.95p

PRICE MATCH: – If you find any of the above products cheaper in this March Edition of *Your Computer*, then we will match that lower price!

Excludes Special Offers. State Advert & Page No.

ACCESS/Mastercard Orders/Enquiries Welcome – Tele 0706 43519

Prices are inclusive of P&P in U.K., Add £1 per Item Outside the U.K.

Send Cheque/P.O./Sterling/ACCESS or Mastercard No. to:-

16-Bit Software (Dept STS),
24 Bankfield Lane, Rochdale, Lancs., OL11 5RJ

YOUR COMPUTER *Classified*

CONTACT HARRI NADA ON 01-834 1717

MICROWARE COMPUTING SERVICES

Amiga 500 with TV Modulator and Super Starter Pack	£449
Amiga 2000 with 1MB RAM, Internal 880K Disk Drive	£999
Atari 520STFM with built in Modulator, Starter Pack	£269
Atari 1040STF with 1MB Disk & Mono Monitor	£479
Atari Mega ST-2 with Mono Monitor & 2MB of RAM	£899
Amstrad PCW9512 Word Processing System. We accept Tradeins on this	£499
Amstrad PPC Portable Computer with 720K Disk Drive	£449
Z88 Laptop Computer with Software	£269
A1084 Hi-res Colour Monitor for A1000/2000/500	£299
Philips 8833 Colour Stereo Monitor for Amiga and Atari STs	£279
512K RAM Expansion with clock for Amiga 500	£95
3½" External Disk Drive for Amiga or Atari. State which	£129
Cannon PJ1080A Colour Ink Jet Printer with Parallel Inter'	£449
Citizen MSP 10E Printer with 160/40cps parallel Interface	£239
Micro P 26 Daisy Wheel Printer Parallel Interface	£249

Just a small sample of our wide range of products.
SAE for Catalogue etc.

MICROWARE COMPUTER SERVICES P.O. BOX 2, SKEGNESS, LINCS, PE25 2QL Tel: 0754 610217

High Clip, Lifetime Guarantee, 14 Day Money Back Guarantee By Top Manufacturers, eg Memorex, Wabash, etc.
Price Includes VAT & Postage
Unbranded Disks

Qty	10	25	50	100	200
5.25" DS/DD 48tpi	5,50	11.00	20.00	38.00	75.00
5.25" DS/DD 96tpi	6.00	11.50	21.80	39.50	77.50
5.25" HD 1.6Mb	16.00	36.00	70.00	130.00	250.00
3.3" DS/DD 135tpi	11.50	26.60	51.90	98.00	189.00
3.5" DS/DD 135tpi	10.95	25.00	48.90	95.00	185.00

Please Call for 200+ Quantity Discounts

5.25" 10 Disk Plastic Lib. Case £1.50 /3.5" 10 Disk Plastic Lib. Case £1,30
All Disks supplied with labels, 5.25" also have sleeves and write protects.
Price includes VAT & PP (UK)
Unbranded does not mean poor quality, why not take advantage of our 14 day money back guarantee and try a trial pack of 10 disks.
Credit Cards Welcome
Tel: 0329 282083 (24 hours)
Cheques/PO to: Athene Consultants
33 Holly Grove, Fareham, Hants PO16 7UP

Terrific Utilities for Spectrum and Amstrad
BRADWAY SOFTWARE

For the Amstrads:

LETTA-HEAD PLUS (PCW8256, 8512) — £17.50
Create business & personal stationery, letterheads, labels, posters, etc. using graphics and 25 different character fonts. Select the required format & print all the copies you need!

LaPrint (PCW8256, 8512) — £19.50
Print LocoScript 1 documents on any daisywheel, maintaining ALL LocoScript features. More powerful than LocoScript 2.

WordFinder (PCW8256, 8/9512 CPC6128 PC1512 BBC) — £12.50
At last – rescue for the crossword & word game enthusiast! Instant access to 24000 unique words (not derivatives), names & anagrams.

For Spectrum 48, Plus, 128, +2:

Letta head Plus	**WordFinder**
Dumpy 3	**Lin-O-Type**
Astrum+ assembler	**Discovery Disc Manager**

For further details please see our ads in other issues, or send for a full catalogue. To order, please add 50p UK, Europe, £2.00 worldwide airmail P&P per program.

Bradway Software (YC) 33 Conalan Avenue, Sheffield, S17 4PG

J.C.S.

☆ **Atari 520 STFM – £299**
Including starter pack

☆ **Amiga A500 – £449**
Including starter pack

☆ **Atari Megga ST – 4 Meg.**
Phone for quote

☆ **Entry Level PC – £477**
Including monitor

☆ **Sega Master Systems – £94.95**

ALL HARDWARE AND SOFTWARE AVAILABLE NOW!! MAIL ORDER OFFER

4 Graham Street, Airdrie, Scotland ML6 6BU Telephone: (0236) 69874

ADVERTISING COPY DEADLINES

YOUR COMPUTER

MAY
ISSUE 18.3.88

JUNE
ISSUE 15.4.88

JULY
ISSUE 12.5.88

SIRIUS

EXPANSION PRODUCTS

ISSUE 18 NORFOLK ROAD
BRIGHTON BN1 3AA
(0273) 736880

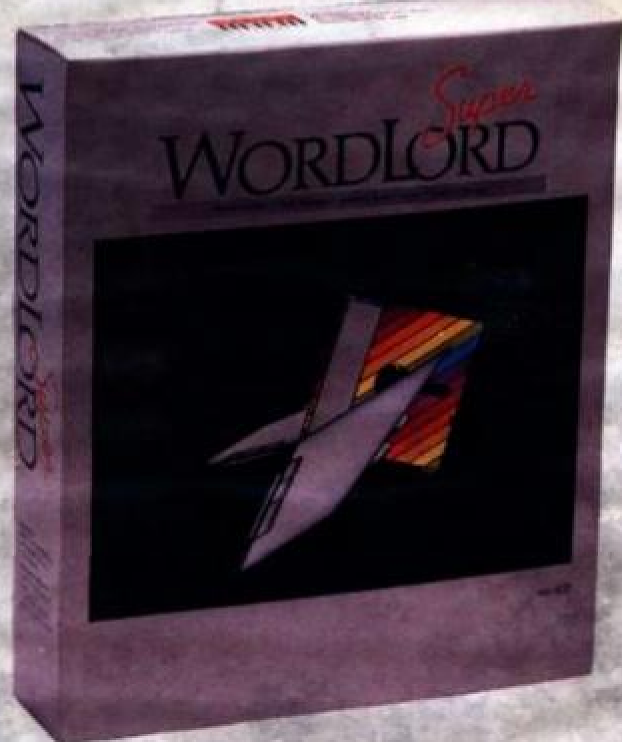
MSX-LINK seeks new members, for further information please send a SAE to: MSX-LINK, North Lodge, Cairnhill Road, Airdrie, Scotland. ML6 9RJ

MSX-LINK seeks new members, for further information please send a SAE to: MSX-LINK, North Lodge, Cairnhill Road, Airdrie, Scotland. ML6 9RJ

All the wordprocessing power you need.

For just £69.95!

PLUS VAT & P&P



WordLord Super
Fast and powerful.

One of the fastest and most powerful wordprocessing packages, WordLord Super offers you a Data Manager, bit-mapped Graphics and Font Editing capabilities, a Spelling Checker with a dictionary of 70,000 words, that is user-expandable ... and lots more. For just £69.95!

Unbelievable, but true.
For its wordprocessing capabilities alone, WordLord Super is worth much, much more.

Take a hard look at the features. Compare them with other wordprocessing packages, and then decide.

KEY FEATURES

- Reformat with right justification
- Newsformat columns with right justification – 9 columns
- Overwrite block
- Interactive hyphenation
- Tabular formats
- Draw lines vertically/horizontally
- Converts capital to lower case/vice versa
- Help/Dir/List on other window
- Math capabilities in tabular format
- Index/Table of contents creation
- Horizontal/Vertical windows
- Built-in mail merge/sort
- Graphic merge with text
- User-defined message during printing
- Print one file while editing another
- Display printout
- On-line spelling checker
- 70K words in built-in dictionary
- Create data base
- Add/Delete/Modify data
- Enquire and view data
- Bit-mapped graphics editor
- Draw lines in 16 directions
- Draw quarter/semi/full circles/ellipses
- Tilt and rotate graphics

...per for only £69.95. Get yourself a WordLord Super today! Hurry! Offer open till stocks last!

...on NW4 4DP. Tel. 01 203 0191 Fax 01 203 3319

...T & P&P. (Quantity)

OR debit by ACCESS ☐

...TURE

System requirements

- IBM PC and true compatibles with 128 Kb RAM
- CGA card for full screen graphics display • MS DOS/PC... later

IBM PC and PC DOS are registered trademarks of IBM Corpn. • MS DOS is a reg...

PROFESSIONAL COMPUTER TRAINING

Invest Now

in Professional Computer Training for you and your staff.

All successful businessmen know that an investment now in professional computer training will save money.

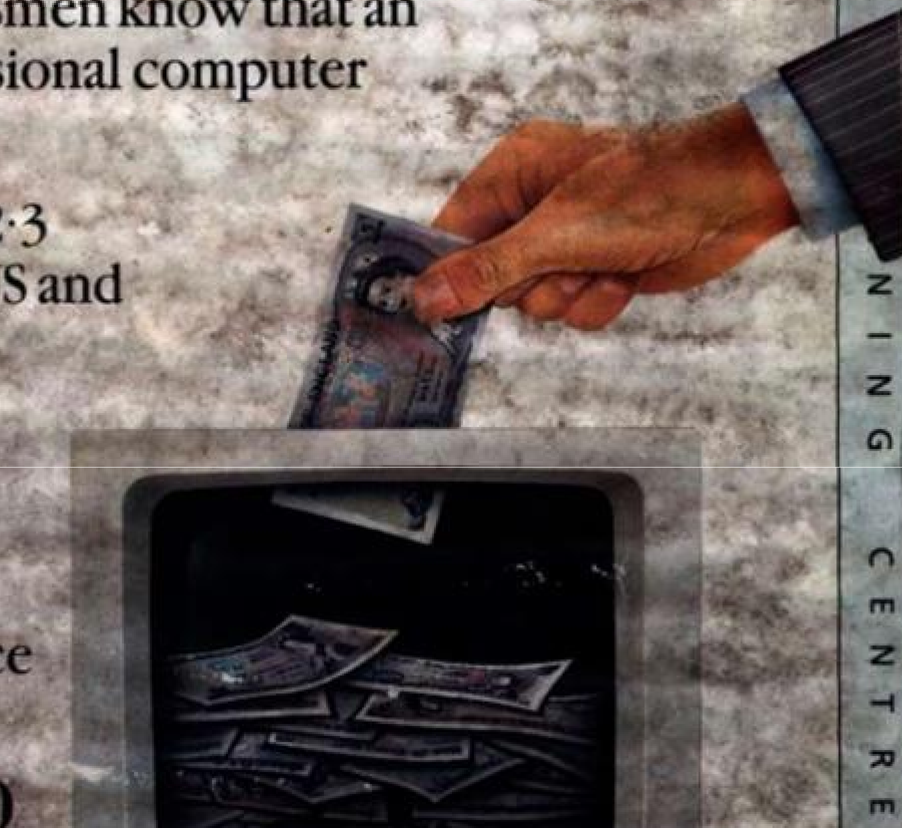
Courses include: Lotus 1·2·3 SuperCalc 4, dBase III PLUS and Locoscript.

These courses are offered at BSSU centres around the country.

Call our reservation service for details of our full offer.

Leeds (0532) 451000

Make sure you're properly trained



British TELECOM

...s in the So... ...ll our London office on

01-623 498...

All courses subject ... ...ity.

...MPU... ...ING

PROFESSIONAL CENTRES NATIONWIDE

PROFESSIONAL TRAINING CENTRES NATIONWIDE